G.SHDSL .Bis NTU

User Manual

Version 0.03

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1. Introduction

The G.SHDSL .bis NTU offers three different interface (E1, Serial and Ethernet) connected customers to high-speed TDM services .This series have four models on the following:-

E1 interface model :
Offers two different ways have connect customers to high-speed TDM services with two G.703 E1 interfaces (Balance 120Ω RJ45 jack and Unbalance 75Ω dual BNCs). The G.703 interface will carry 64kbps to 2.048Mbps.

Serial (V.35) interface model:
Offers customers premises has high-speed TDM services with a DB25 interface. The industry standard DB25 interface can be configured as a V.35/RS530 or V.36/X.21 connection. The DB25 connection transfers data up to 5.696Mbps.

Ethernet interface model:
Offers customers premises has high-speed TDM services with a LAN interface. The industry standard LAN interface can detect a 10M or 100M connection automatically.

Three interface (E1, Serial and Ethernet) in one model:
Offers three types interface: E1 interface (balance 120Ω RJ45 jack and unbalance 75Ω dual BNCs), V.35 interface (DB25 female connector) and Ethernet interface (RJ-45 connector).You can select one type of following: (a) E1 interface only (b)V.35 interface only (c) Ethernet interface only (d) E1 and V.35 interface (e)E1 and Ethernet interface.

They can be configured and managed via EOC, or menu-driven VT100 compatible Asynchronous Terminal Interface, either locally or remotely.

The G.SHDSL .Bis NTU is equipped with an auto rate capability that identifies the maximum line rate supported by the copper loop. This powerful automatic configuration capability makes installation and service provisioning simple and painless. Further flexibility is provided in the ability to manually set the maximum NTU speed at different levels for different customer-tailored service offerings.

1.1 Features

- Standard G.shdsl .Bis ITU G.991.2 (2004) supports improved reach/speed and greater interoperability
- Fast and cost-effective provisioning of traditional frame relay (FR or T-HDLC) or TDM leased line services
- User existing copper loop infrastructures
- Can operate back to back connection
- Efficient single wire pair usage
- Up to 5.696Mbps symmetric service bit rate
- Auto rate installation maximizes data rate based on loop conditions
- Auto configuration wetting current to protect SHDSL line
- Local management interface with LCD display
- Remote line loopback
- SHDSL Line performance monitoring (Data Rate and SNR)
- Raw and per time interval statistics
- Bandwidth guaranteed transmission equipment
- Remote firmware upgrade

1.2 Specification

WAN Interface

• Line Rate: ITU G.991.2(2004)
• Coding: trellis coded pulse amplitude modulation (TC-PAM16 and TC-PAM32)
• Support: Annex A ,B , F and G
• Payload rates: 192kbps to 5.696Mbps (N x 64kbps N=3 to 89)
• Connection: RJ-45 jack (2-wire)
• Impedance: 135 ohms

G.703 Interface (as E1)

• Connection: RJ-45 for balanced 120Ω E1 cable
• Connection: BNC for unbalanced 75Ω E1 cable
• Line Rate : 2048KHz +/- 50ppm
• Framing : PCM30/30C/31/31C and Unframed
• Data Rate : 64Kbps to 2.048Mbps (Nx64Kbps , N=1 to 32)
• Operation : Full E1 and Fractional E1

DTE Interface (as V.35)

• Payload rates: Up to 5.696Mbps
• Support V.35/RS-530 or V.36/X.21

LAN Interface (as Ethernet)

• Single Ethernet Interface
• 10/100Mpbs Half/Full Duplex, Auto-sensing, Auto-Crossover
• Up to 1024 MAC address learning, filtering bridge

DSL Timing
• Internal
• From E1 Recovery (as E1)
• From DTE (as V.35 and Ethernet)

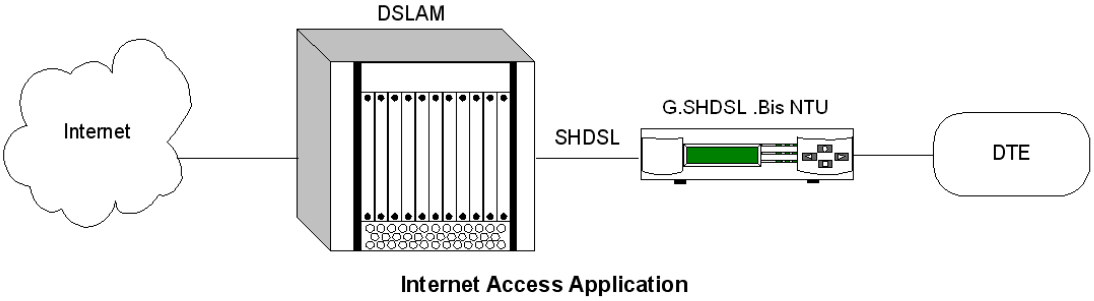
Performance Monitoring
• ES, SES, UAS, Alarms, Errors

Loopback Tests (for E1 and V.35 interface only)
• Local Loopback
• Digital Loopback
• Remote Loopback
• Far-end Loobpack
• Build-in 2047 bit tester

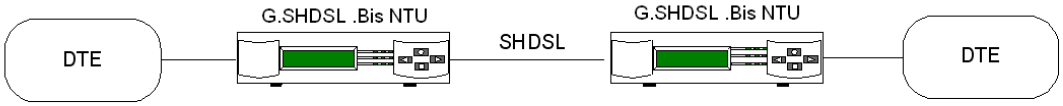
Management
• Configuration with keypad and LCD display
• Console port (RJ45 , RS232C)
• Support firmware upgradeable

Physical/Electrical
• Dimensions: 19.8 x 4.6 x 16.8 cm
• Input: 90~240VAC with 50~60Hz
• Power Consumption: 10W Max
• Operation temperature: 0 to 50℃
• Humidity: Up to 95% (non-condensing)
• External screw for frame grounding

1.3 Applications



Internet Access Application

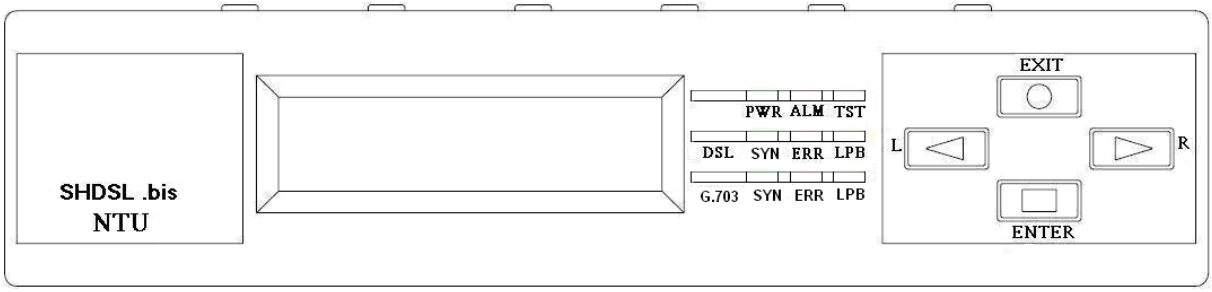


2. Getting to know about the SHDSL.bis NTU

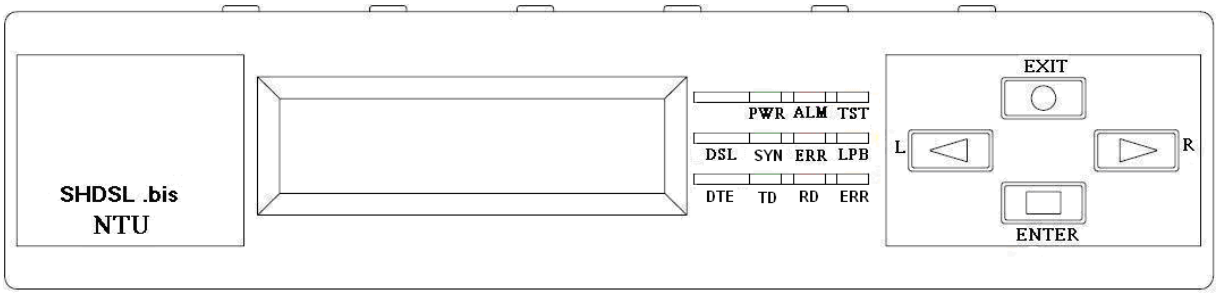
This chapter shows the front and rear panel and how to install the hardware.

2.1 Front Panel

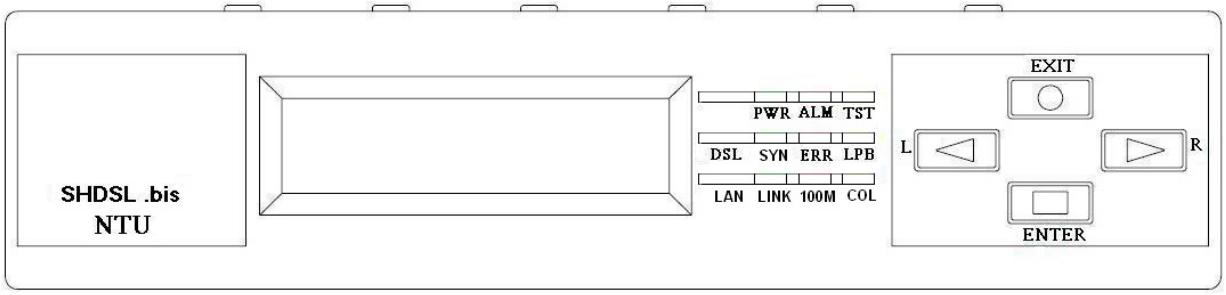
2.1.1. E1 interface model



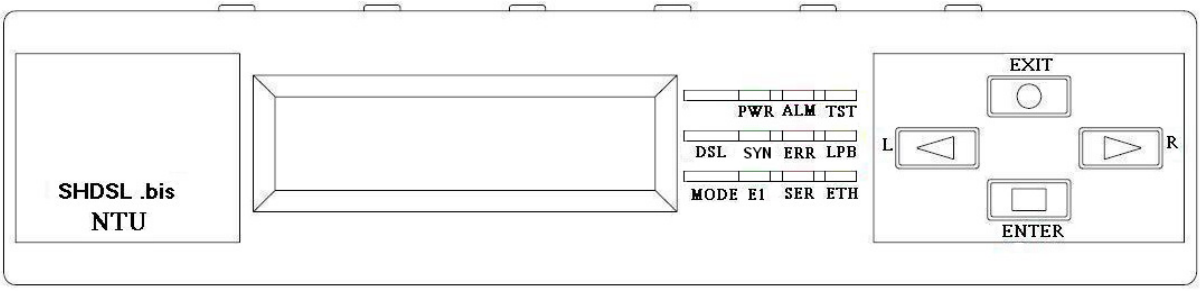
2.1.2. Serial interface model



2.1.3. Ethernet interface model



2.1.4. Three interface in one model



Front panel can be separated into three parts: LCD display, LED indicator and Keypads.

The LCD display can show the status and configuration of device. The local management interface will be done by keypads with this LCD display.

The purpose of key pads is to configure the setting or selecting of function on this NTU.

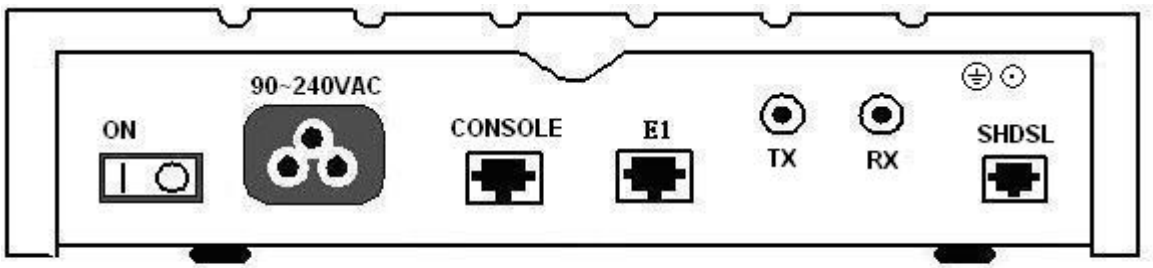
The following table describes the LEDs' function of device.

LED		Color	Action	Description
PWR		Green	On	Power is on.
			Off	Power is off.
ALM		Red	On	System loss.
			Off	System is working nomarally.
TST		Yellow	On	System is testing for connection.
			Off	System is working nomarlly.
SHDSL	SYN	Green	On	SHDSL line is connected.
			Blink	Data transmit in SHDSL line.
			Off	SHDSL line is dropped.
	ERR	Red	Blink	Error second occurs.
			Off	No error second.
	LPB	Yellow	On	Loopback is on.
			Off	Loopback is off.
E1	SYN	Green	On	E1 line is connected.
			Off	E1 line is dropped.
	ERR	Red	Blink	There are error seconds.
			Off	There is not any error second.
	LPB	Yellow	On	Loopback is on.
			Off	Loopback is off.
V.35	TD	Green	On	Data transmit in V.35.
			Off	No data transmit in V.35.
	RD	Green	On	Data receive in V.35.
			Off	No data reveive in V.35.
	ERR	Red	Blink	Error second occurs.
			Off	No error second.
ETH	LINK	Green	On	Data transmit in Ethernet.
			Off	No data transmit in Ethernet.

	100M	Green	On	Data receive in 100M.
			Off	No data receive in 100M.
	COL	Red	Blink	Error collision occurs.
			Off	No error collision.
Mode	E1	Green	Blink	E1 Data tramsmit and receive
			On	E1 cable cable connected
		Red	On	No E1 cable connected
	SER	Green	Blink	Serial Data tramsmit and receive
			On	DTE Connected
		Red	On	DTE Disconnect
	ETH	Green	Blink	Ethernet Data tramsmit and receive
			On	Ethernet cable connected
		Red	On	No Ethernet cable connected

2.2 Rear Panel

2.2.1. E1 Interface Model

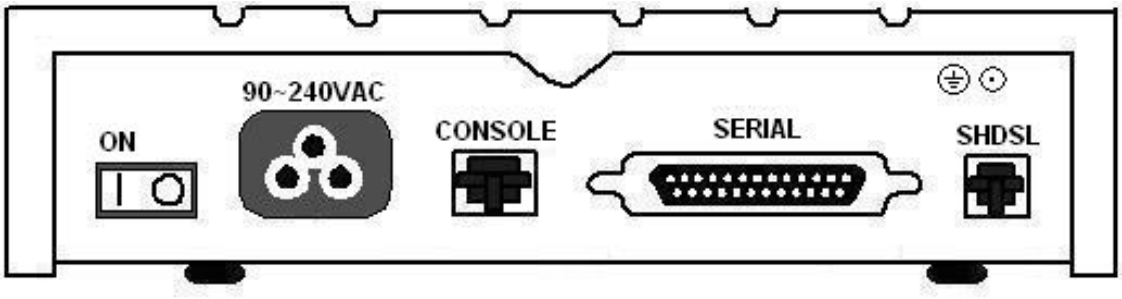


The rear panel of this model is including power switch, power socket, RJ-45 console, RJ-45 G.703, BNC jack for transmitting and receiving and RJ-45 for SHDSL from left to right.

Connector Description

ON	Power switch. Press 1 for turn on and press 0 for off.
90~240V AC	Power socket. It has power adapting function from 90V to 240V.
CONSOLE	RJ-45 for system configuration and maintenance.
G.703	RJ-45 for 120Ω E1 connection with PABX (Private Automatic Branch Exchange) or E1 Router
TX	BNC for 75Ω E1 transmitting
RX	BNC for 75Ω E1 receiving
SHDSL	RJ-45 for DSL connection

2.2.2. Serial (V.35) Interface Model

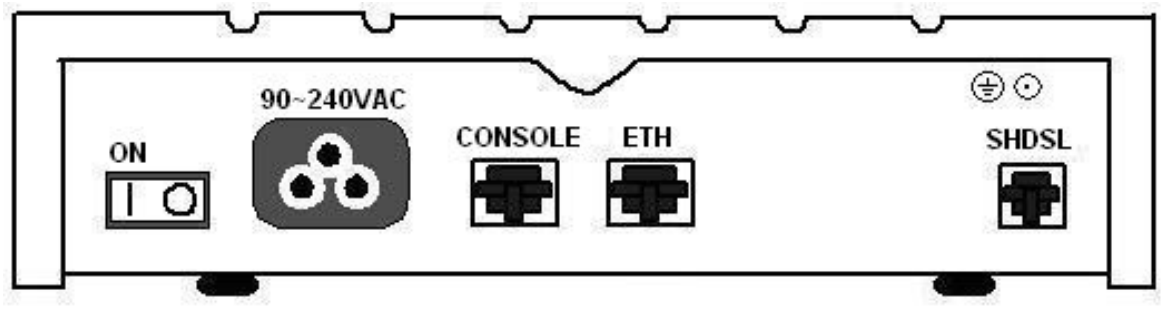


The rear panel of this model is including power switch, power socket, RJ-45 for console cable, DB-25(Female) for V.35 cable and RJ-45 for SHDSL from left to right.

Connector Description

ON	Power switch. Press 1 for turn on and press 0 for off.
90~240V AC	Power socket. It has power adapting function from 90V to 240V.
CONSOLE	RJ-45 for system configuration and maintenance.
SERIAL	DB-25 for V.35 cable
SHDSL	RJ-45 for DSL Connection

2.2.3. Ethernet Interface Model

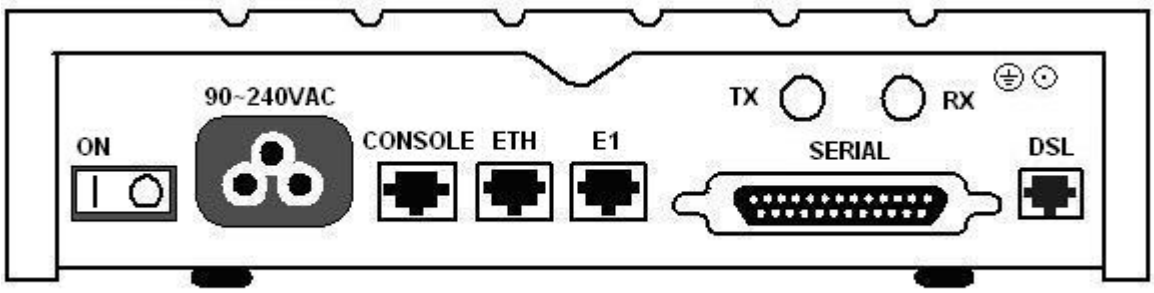


The rear panel of this model is including power switch, power socket, RJ-45 for console cable, LAN for Ethernet cable and RJ-45 for SHDSL from left to right.

Connector Description

ON	Power switch. Press 1 for turn on and press 0 for turn off.
90~240V AC	Power socket. It has power adapting function from 90V to 240V.
CONSOLE	RJ-45 for system configuration and maintenance.
ETH	RJ-45 LAN port for Ethernet cable
SHDSL	RJ-45 for DSL Connection

2.2.4. Three interface in one Model



The rear panel of this model is including power switch, power socket, RJ-45 for console cable, LAN for Ethernet cable, RJ-45 G.703, BNC jack for transmitting and receiving, DB-25(Female) for V.35 cable and RJ-45 for SHDSL from left to right.

Connector Description

ON	Power switch. Press 1 for turn on and press 0 for off.
90~240V AC	Power socket. It has power adapting function from 90V to 240V.
CONSOLE	RJ-45 for system configuration and maintenance.
ETH	RJ-45 LAN port for Ethernet cable
E1	RJ-45 for 120Ω E1 connection with PABX (Private Automatic Branch Exchange) or E1 Router
SERIAL	DB-25F for V.35 cable
TX	BNC for 75Ω E1 transmitting
RX	BNC for 75Ω E1 receiving
DSL	RJ-45 for DSL connection

2.3 Installation

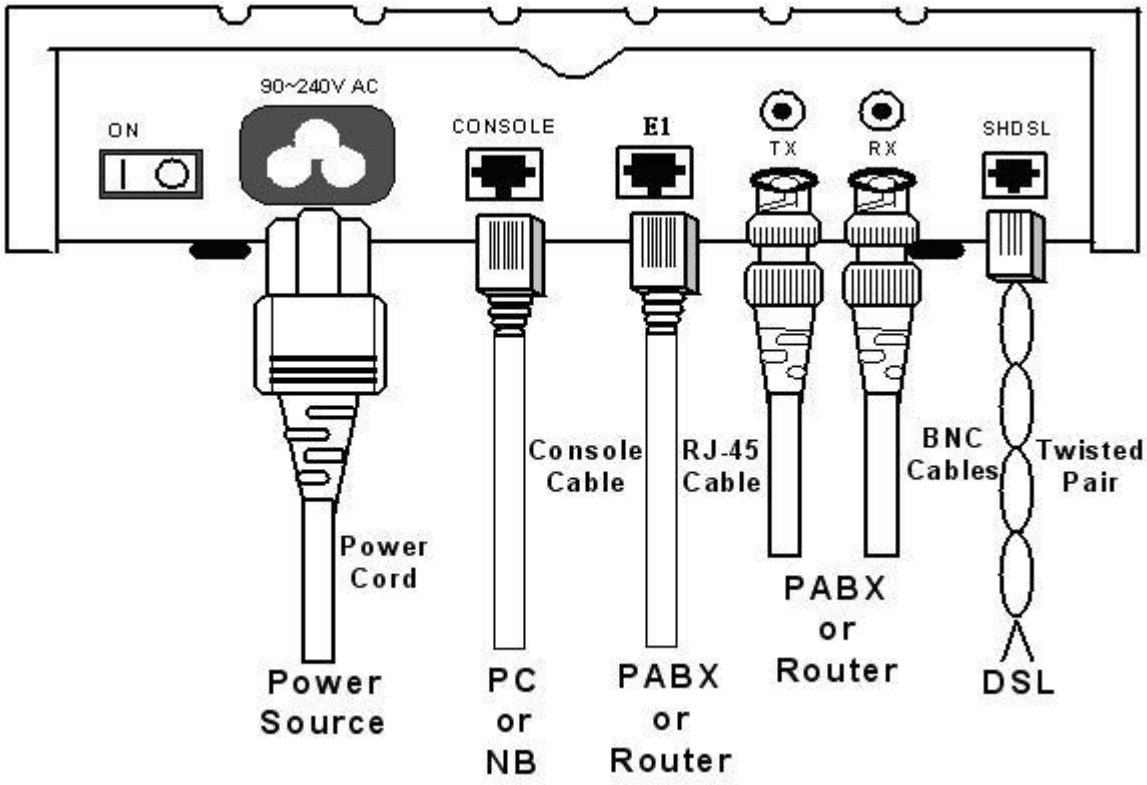
Note: To avoid possible damage to this NTU, do not turn on the product before hardware installation.

(a) Plug the power cord in the power socket.
(b) Plug the console port in console if you want to configure the NTU with VT100 program of NB or PC.
(c) Plug the E1 cable (Either 75Ω BNC cables or 120Ω cable) / SERIAL cable / Ethernet cable
(d) Plug SHDSL cable
(e) Power on

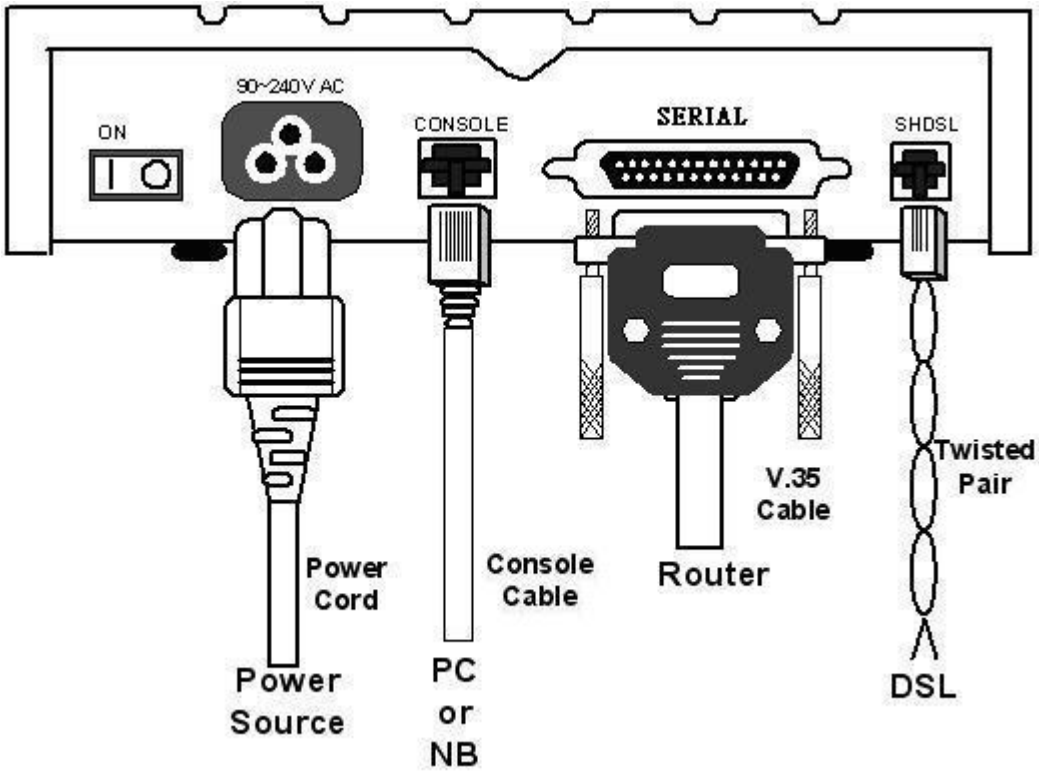
Model	Interface modes support
E1 interface model	E1 interface
V.35 interface model	V.35 interface
Ethernet interface model	Ethernet interface
Three interface in one model	E1 interface
	V.35 interface
	Ethernet interface
	E1+V.35 interface
	E1+Ethernet interface

Only the three interfaces in one model can support all five type interface.

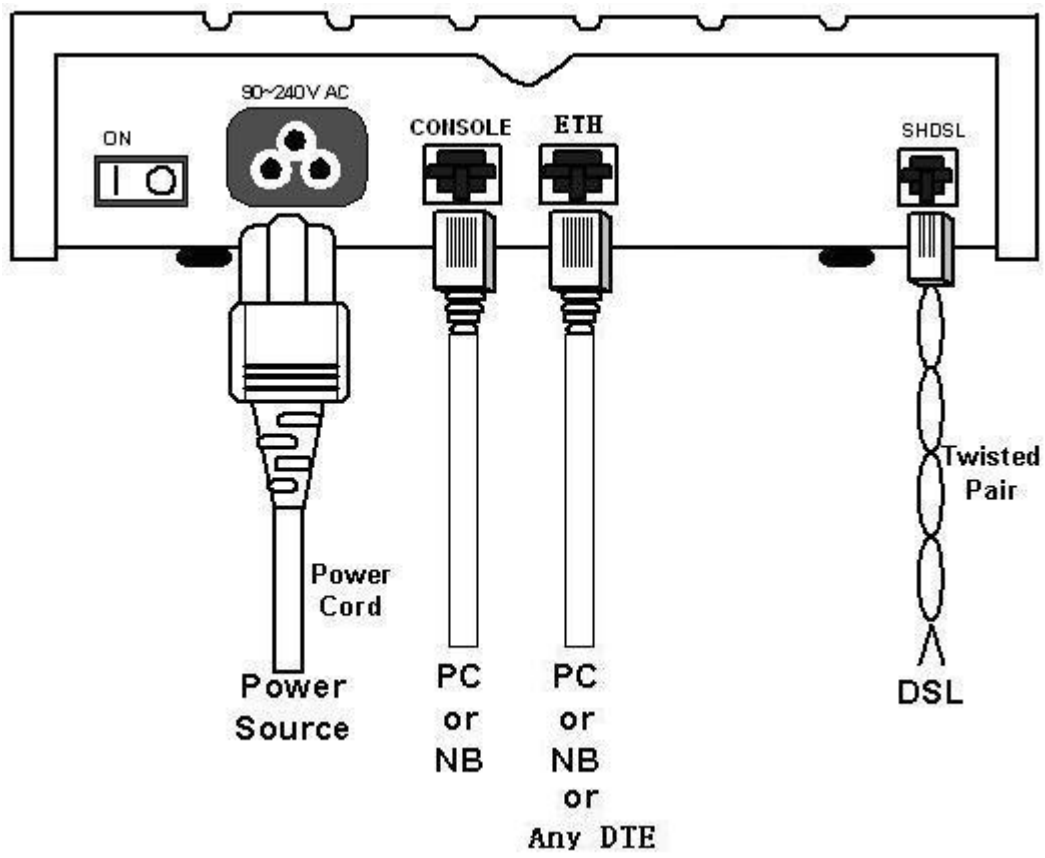
2.3.1. E1 Interface



2.3.2. V35 Interface



2.3.3. Ethernet Interface



Protective earth: The marked lug or terminal should be connected to the building protective earth bus.

Before connecting this unit to a power source and connecting or disconnecting any other cable, the protective earth terminals of this unit must be connected to the protective ground conductor of the mains AC power cord. If you are using an extension cord (power cable) make sure it is grounded as well. Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

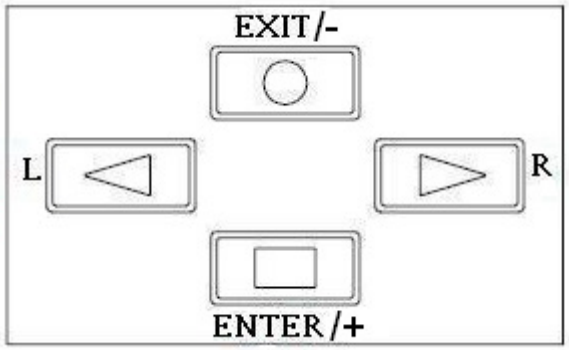
Warning! High voltage. Do not open the housing

3. Configuration with Keypad and LCD

This chapter provides information about configuration your G.SHDSL .Bis NTU via front panel LCD display and keypads.

3.1 Key Pads

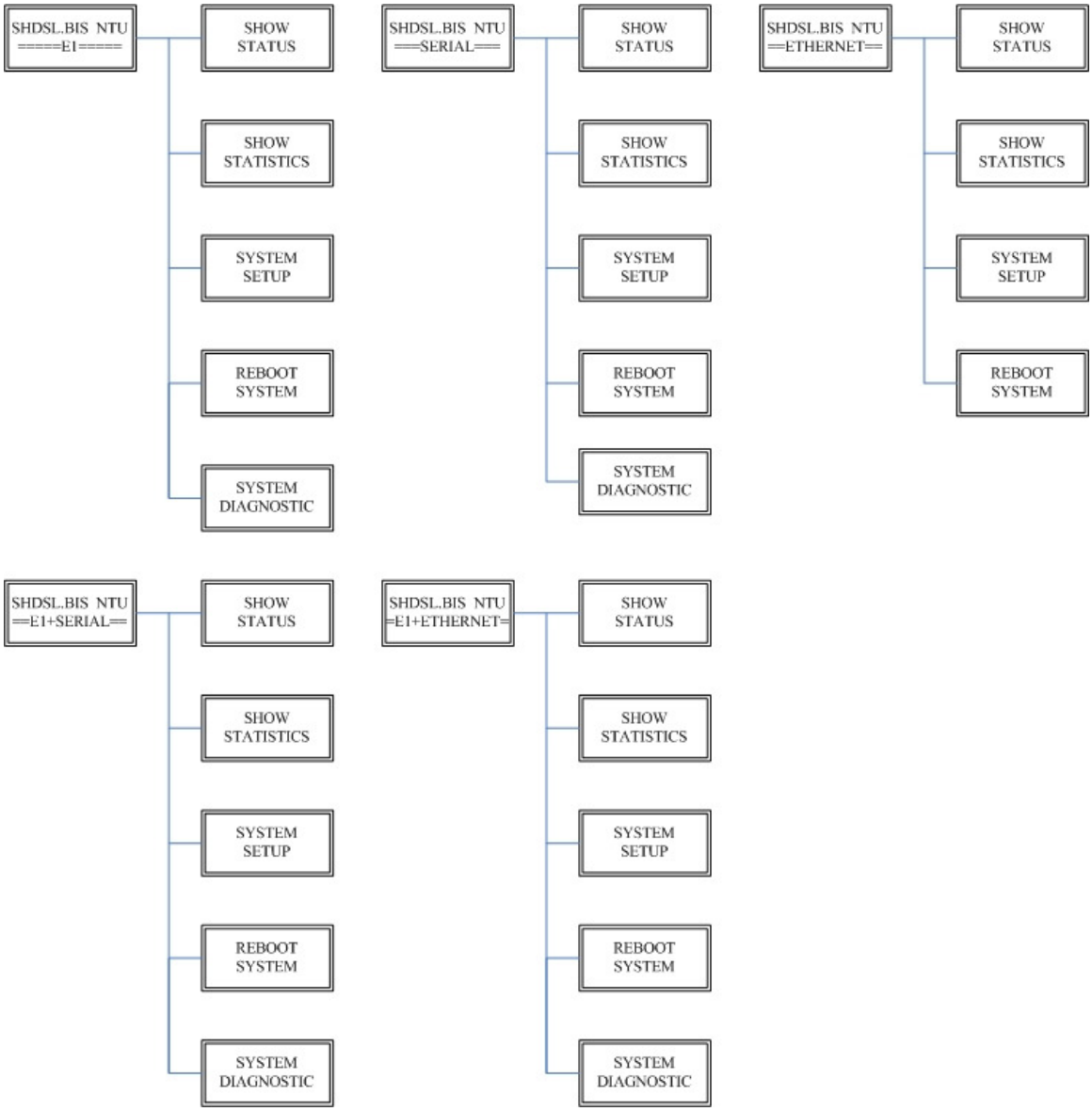
The product is designed for user-friendly configuration with keypads and LCD display without using PC or NB with VT100 terminal.



Key Pad		Description
Exit/-	●	Return to previous configuration menu.
Enter/+	■	Skip to next configuration menu or configure the item.
L	◀	Select other parameter in the same level menu.
R	▶	Select other parameter in the same level menu.

3.2 Main menu Tree

After turning on device, the LCD display will prompt **G.SHDSL .BIS NTU.** Press ***Enter*** to enter. There will display some sub-menu of the following.



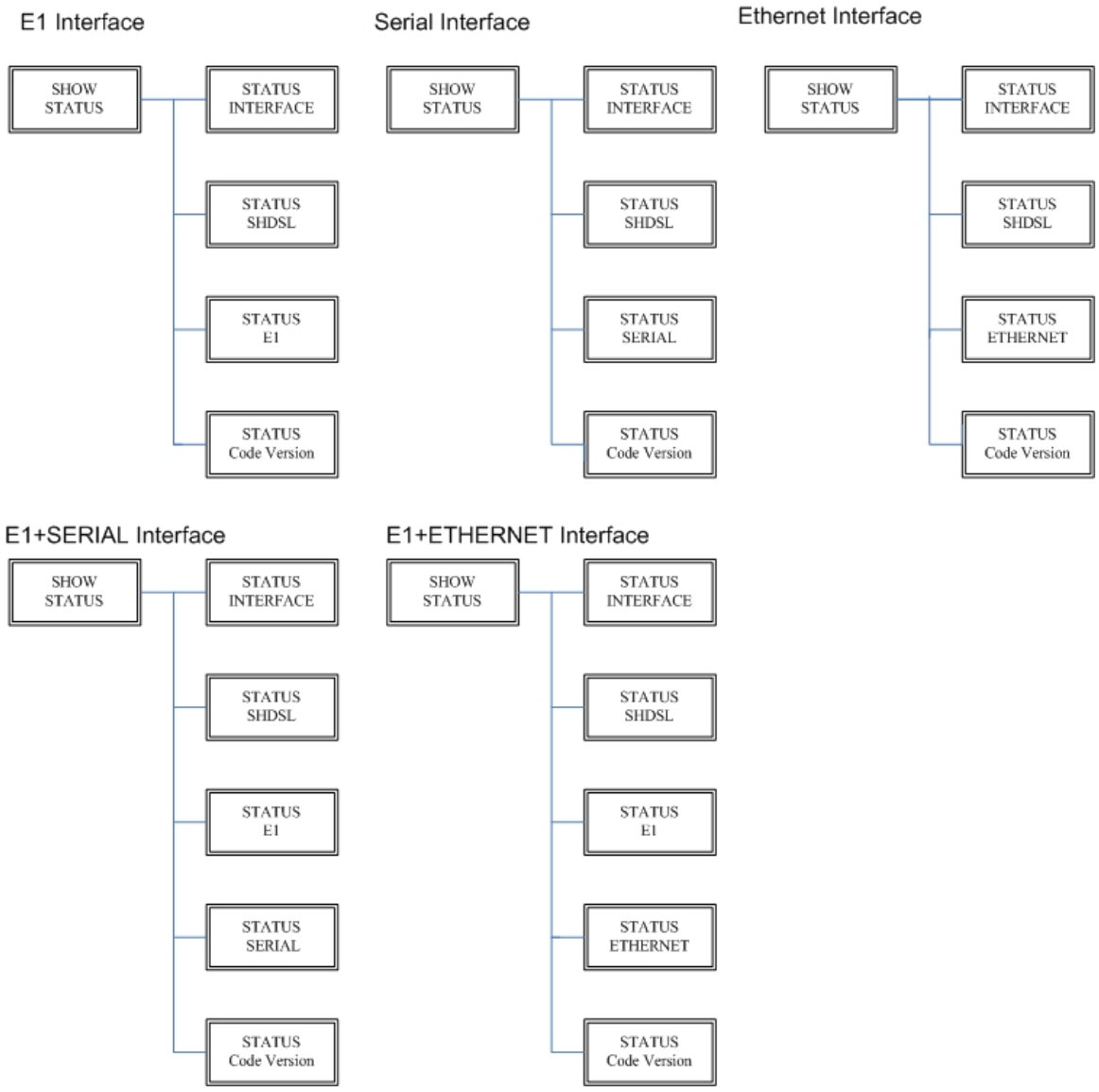
Please notice that Ethernet interface mode haven't SYSTEM DIAGNOSTIC.

For more detail on those sub-menu, please refer to each chapter.

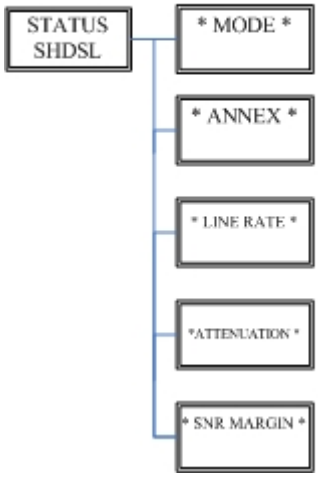
3.3 Menu tree for SHOW STATUS

You can check the status via LCD display.

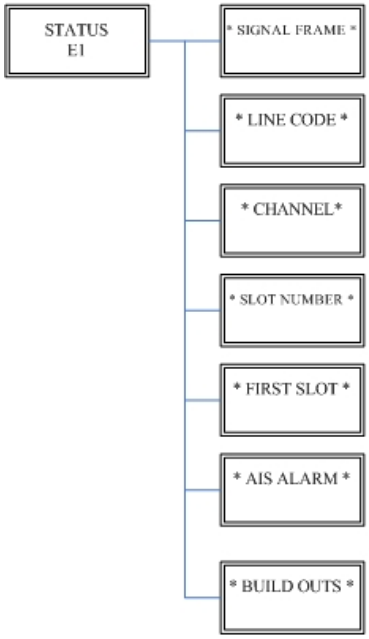
The SHOW STATUS menu tree is as following.



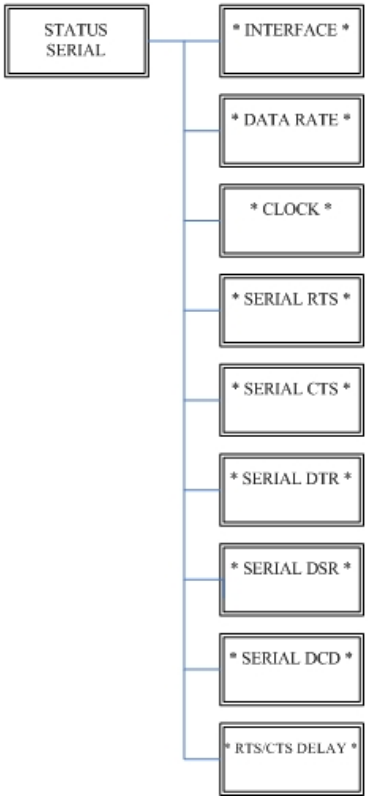
SHOW STATUS > STATUS SHDSL



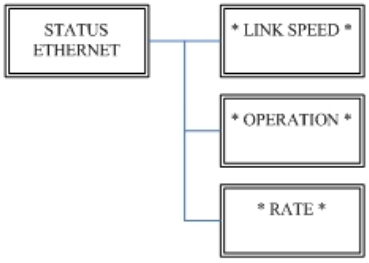
SHOW STATUS > STATUS E1



SHOW STATUS > STATUS SERIAL



SHOW STATUS > STATUS ETHERNET



3.4 Menu tree for SHOW STATISTICS

The product can display two kinds of statistics data:

(a) Current 15 minutes period and 96 previous 15-minute period of SHDSL performance.

(b) Current 24 hour period and 7 previous 24-hour periods of SHDSL performance.

If there using on E1 interface mode, it can also show the E1 performance data.

(c) Current 15 minutes period and 96 previous 15-minute period of E1 performance.

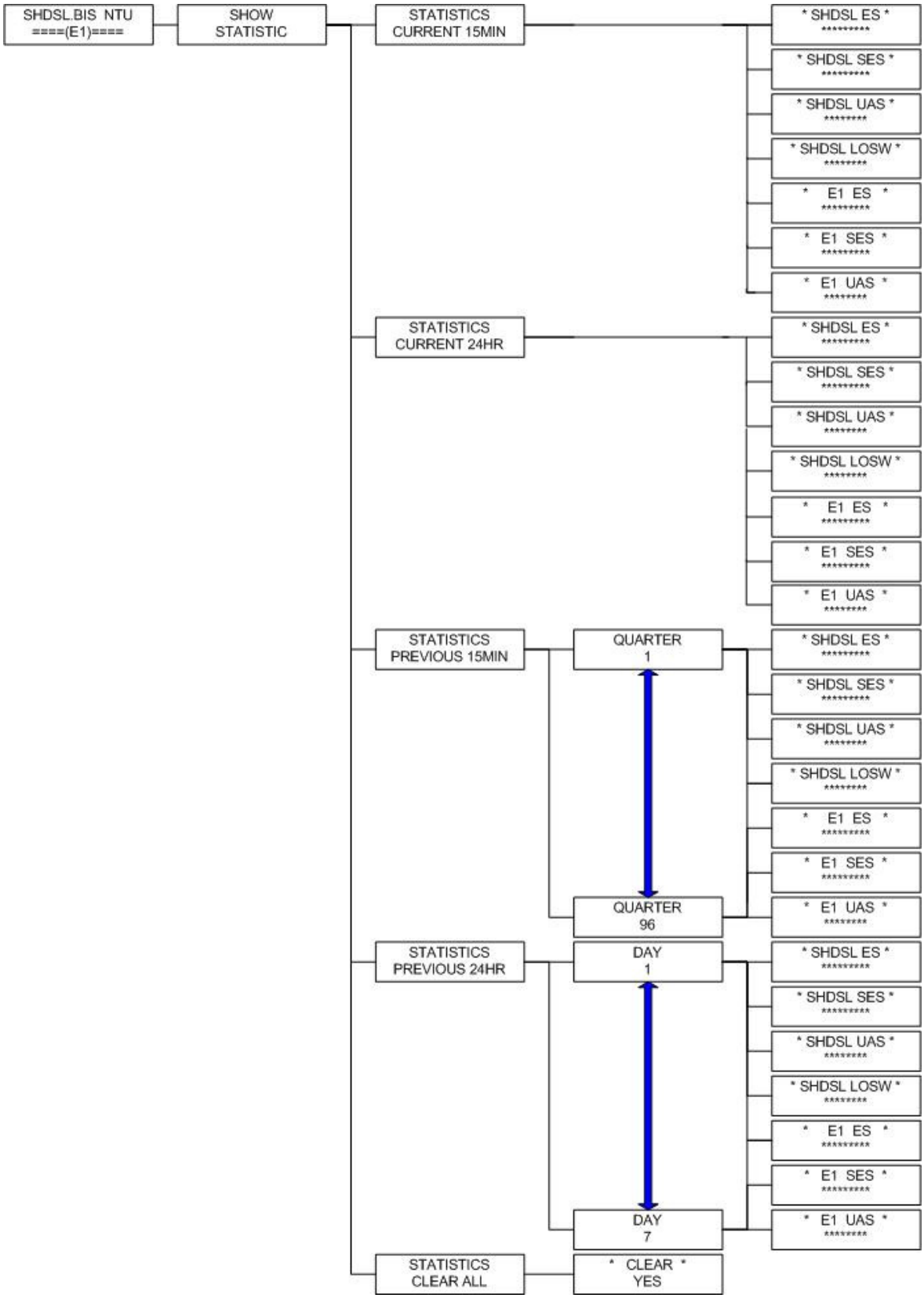
(d) Current 24 hour period and 7 previous 24-hour periods of E1 performance.

SHDSL
ES
SES
UAS
LOSW

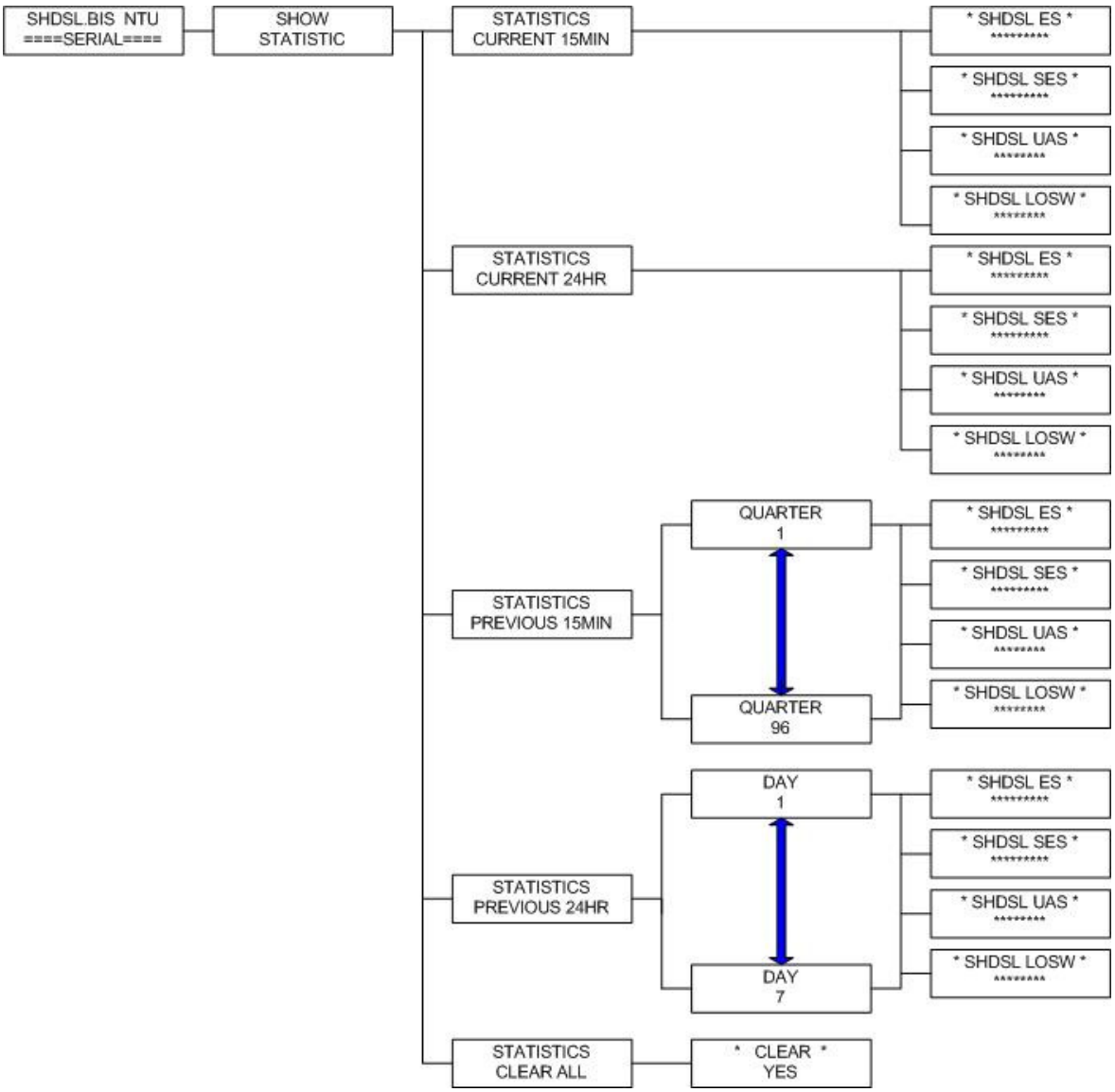
E1
ES
SES
UAS

ES	Error Second
SES	Severely Error Second
UAS	Unavailable Second
LOWS	Loss of Synchronization word

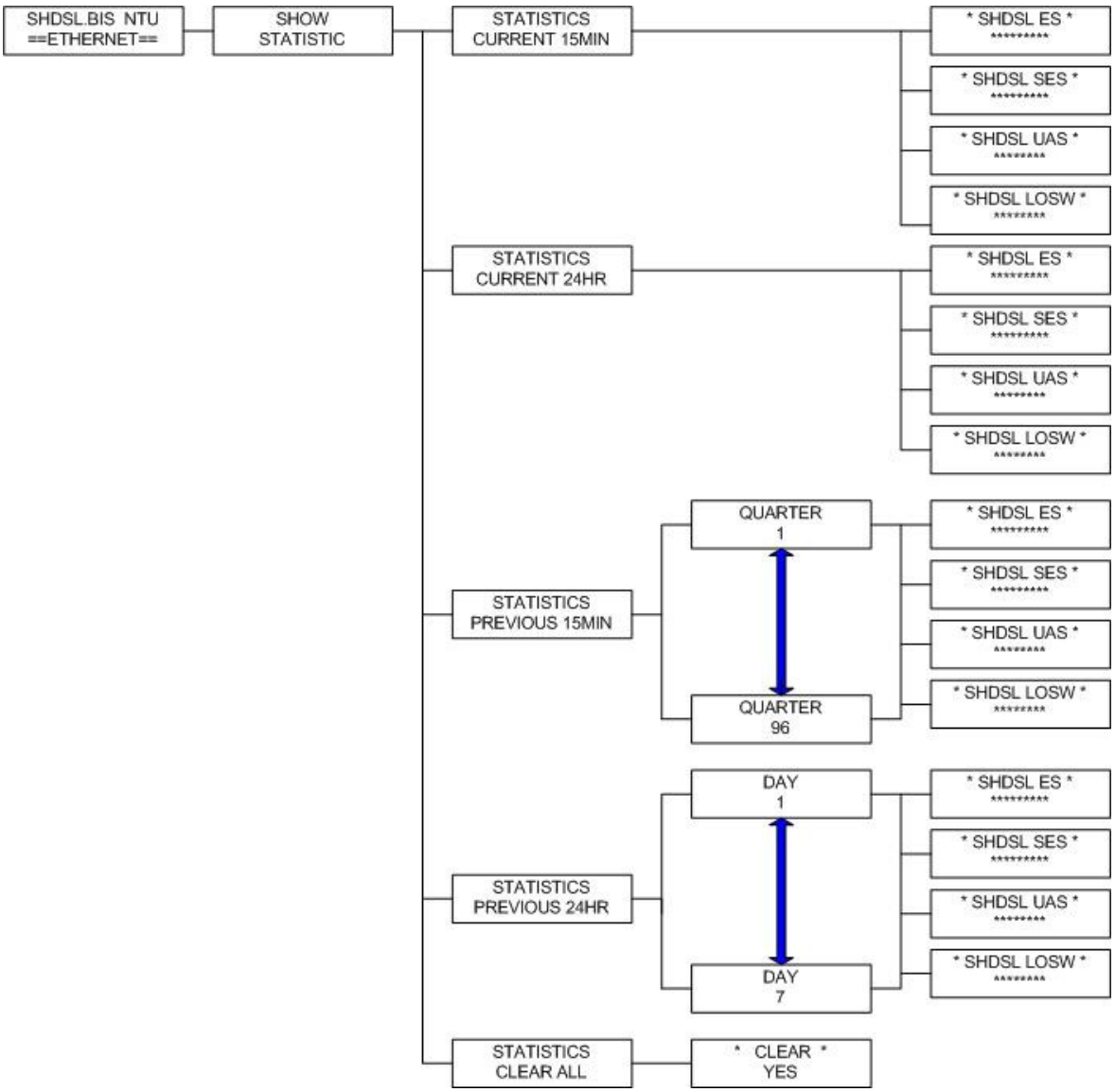
3.4.1. Show Statistic on E1 Interface



3.4.2. Show Statistic on Serial (V.35) Interface



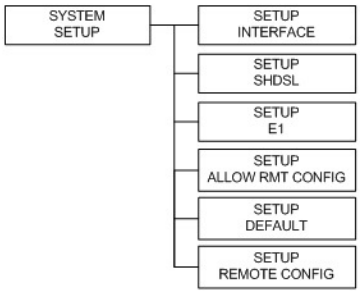
3.4.3. Show Statistic on Ethernet Interface



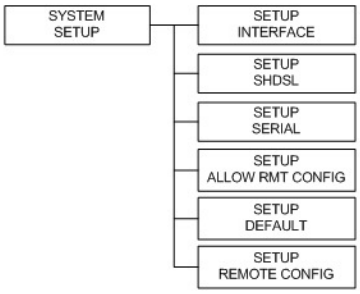
3.5 Menu tree for SYSTEM SETUP

You can setup five interface mode via LCD display.

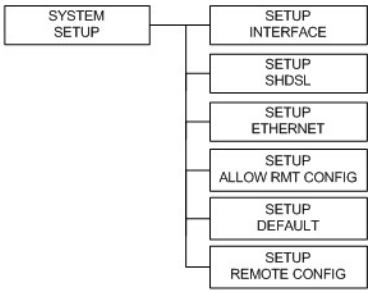
E1 Interface Mode



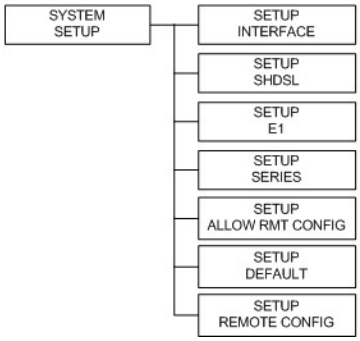
Serial Interface Mode



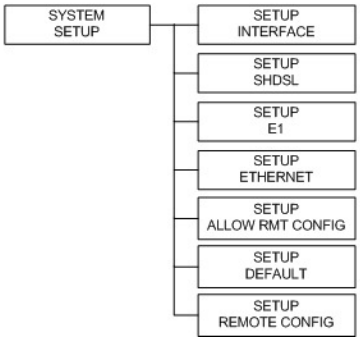
Ethernet Interface Mode



E1 + Series Interface Mode

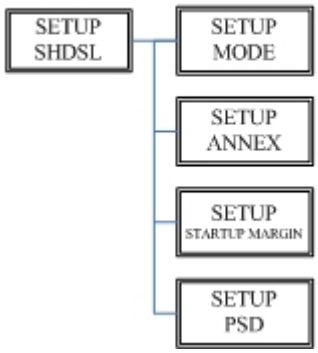


E1 + Ethernet Interface Mode



3.5.1. Sub-Menu tree for SETUP SHDSL

SYSTEM SETUP > SETUP SHDSL



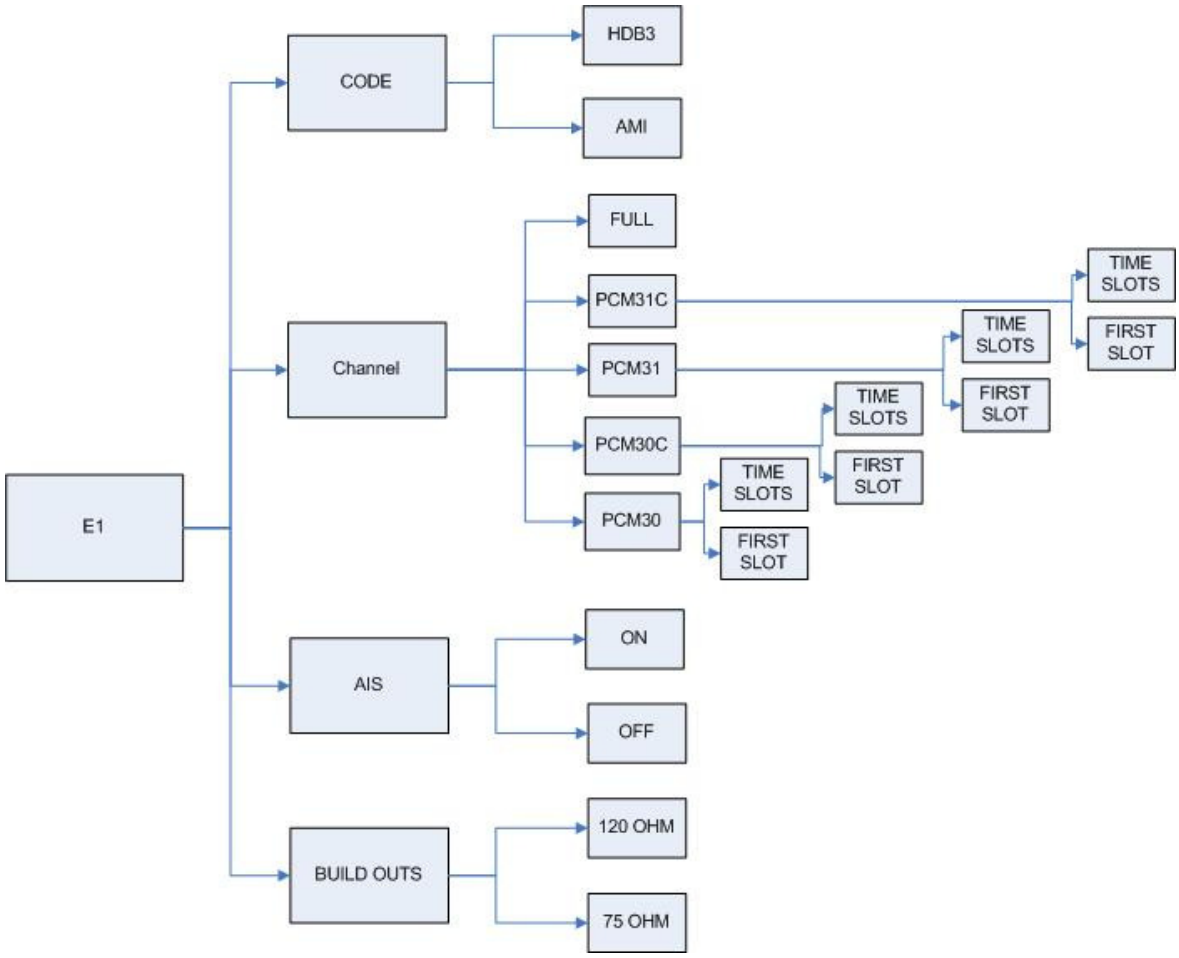
SETUP SHDSL	*Selection items*
SETUP MODE	STU-R, STU-C-INTCLK, STU-C-EXTCLK
SETUP ANNEX	A, B, F, G
SETUP STARTUP MARGIN	-10 to 21
SETUP PSD	SYM, ASYM

The following are commonly used acronyms for **SETUP MODE**:

STU-R	RT side, where the clock source is set to external
STU-C-INTCLK	CO side, where the clock source is set to internal
STU-C-EXTCLK	CO side, where the clock source is set to external

3.5.2. Sub-Menu tree for SETUP E1 Interface

SYSTEM SETUP ➔ SETUP E1



E1 parameter setting:

E1 Items	Setting
Channel	PCM31 PCM31C PCM30 PCM30C FULL
Code	HDB3 AMI
AIS	On Off
Build Outs	120 ohms 75 ohms

Framer Setting:

Framer		Slot Number	First Slot
PCM31	FAS	1 to 31	1 to 31
PCM31C	FAS+CRC4	1 to 31	1 to 31
PCM30	FAS+CAS	1 to 30	1 to 31 (can't use 16)
PCM30C	FAS+CAS+CRC4	1 to 30	1 to 31 (can't use 16)
FULL	UNFRAMED		

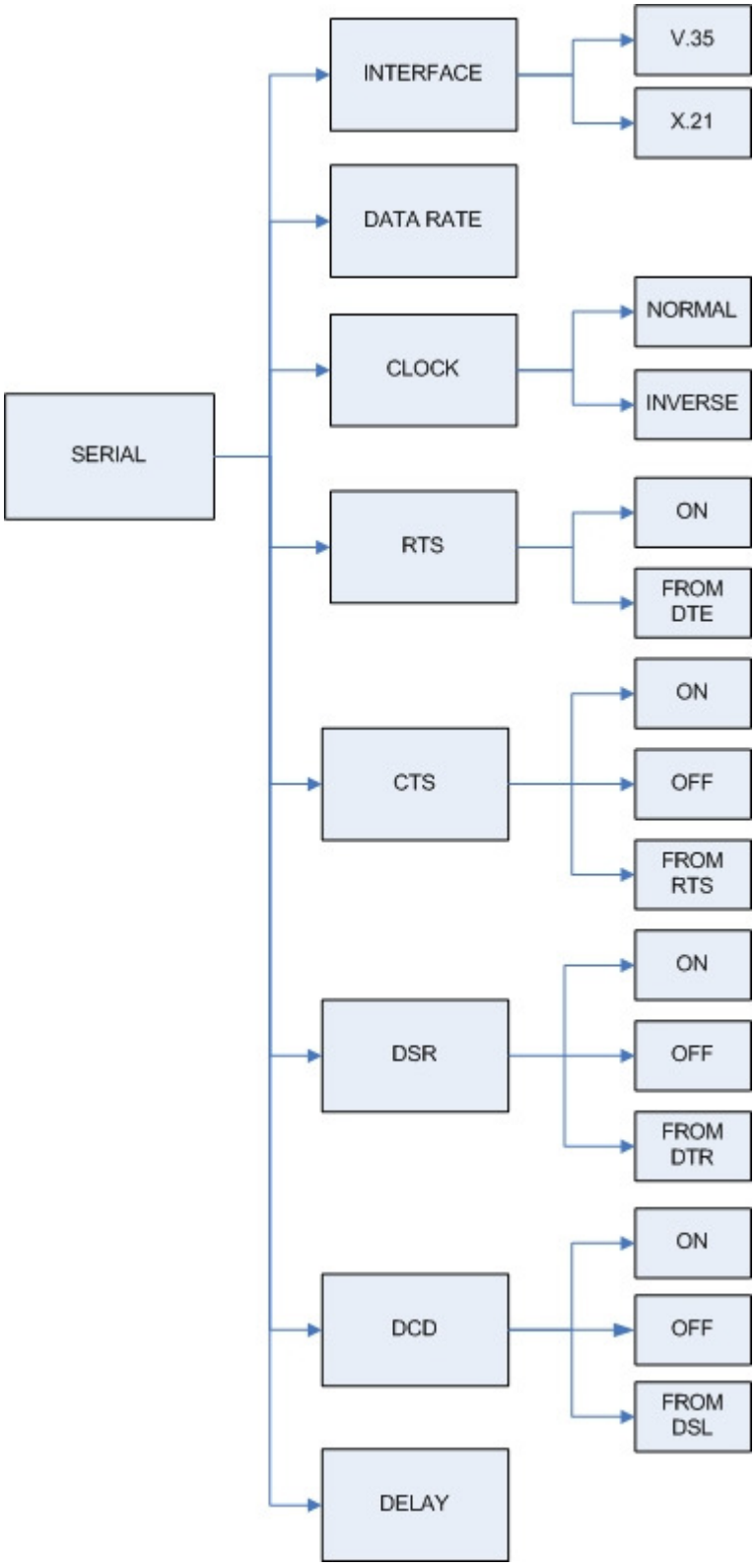
The first time slot setting:

Channel	Number of slot	1st slot
FULL (UNFRAMED)	-----	-----
PCM31 PCM31C	31	1
	30	1~2
	29	1~3
	28	1~4
	27	1~5
	26	1~6
	25	1~7
	24	1~8
	23	1~9
	22	1~10
	21	1~11
	20	1~12
	19	1~13
	18	1~14
	17	1~15
	16	1~16
	15	1~17
	14	1~18
	13	1~19
	12	1~20
	11	1~21
	10	1~22
	9	1~23
	8	1~24
	7	1~25
	6	1~26
	5	1~27
	4	1~28
	3	1~29
	2	1~30
	1	1~31
PCM30 PCM30C	30	1
	29	1~2
	28	1~3

	27	1~4
	26	1~5
	25	1~6
	24	1~7
	23	1~8
	22	1~9
	21	1~10
	20	1~11
	19	1~12
	18	1~13
	17	1~14
	16	1~15
	15	1~15,17
	14	1~15,17~18
	13	1~15,17~19
	12	1~15,17~20
	11	1~15,17~21
	10	1~15,17~22
	9	1~15,17~23
	8	1~15,17~24
	7	1~15,17~25
	6	1~15,17~26
	5	1~15,17~27
	4	1~15,17~28
	3	1~15,17~29
	2	1~15,17~30
	1	1~15,17~31

3.5.3. Sub-Menu tree for SETUP SERIES Interface

SYSTEM SETUP ➔ SETUP SERIES

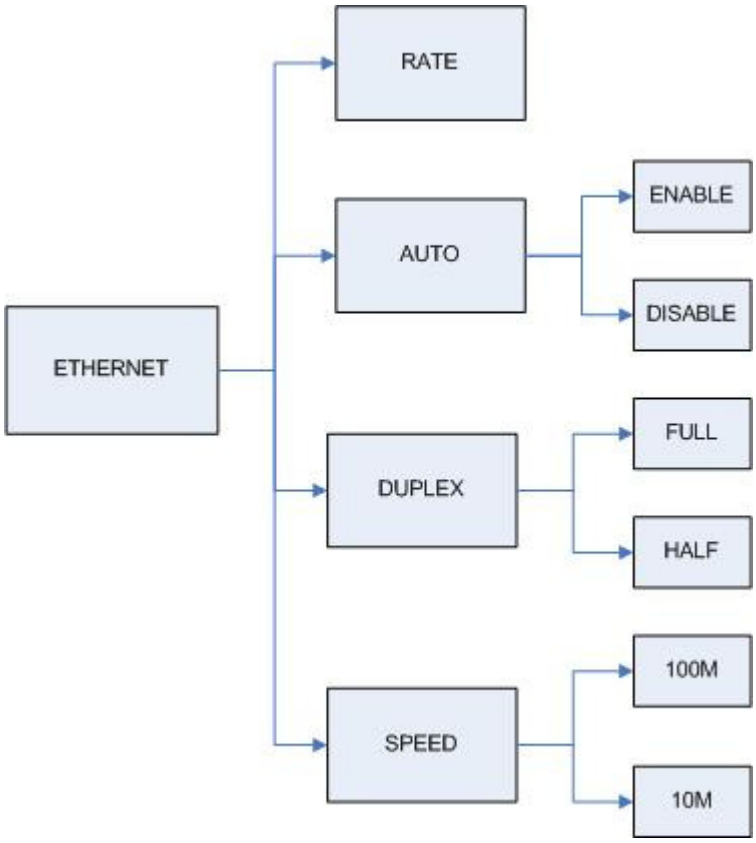


Serial interface control signal setting:

Serial Items	Setting
INTERFACE	V.35 X.21(RS-530)
Nx64K (Rate)	1 ~ 89 (Annex F/G) 1 ~ 36 (AnnexA/B)
CLOCK	Normal Inverse
RTS	On From DTE
CTS	On Off From RTS
DSR	On Off From DTR
DCD	On Off From DSL
DELAY	0mS 1mS 2mS 3mS

3.5.4. Sub-menu tree for SETUP Ethernet Interface

SYSTEM SETUP ➔ SET UP ETHERNET



If you set Ethernet Auto Negotiation is **Enable**, the default setting on **Duplex** is Full and **Speed** is 100M.

If you set Ethernet **Auto** Negotiation is as Enable, the **Duplex** and **Speed** can't be set up and using auto configuration.

Ethernet Items	Setting	
Rate	1 ~ 89 (Annex F/G) 1 ~ 36 (Annex A/B)	
Auto	Disable	Enable
Duplex	Full-Duplex Half-Duplex	Auto Configuration
Speed	100M 10M	Auto Configuration

Table of E1+ Serial interface and E1+Ethernet interface mode (Annex A /B):

E1 interface			Serial interface Ethernet interface
Channel	Number of slot	1st slot	Nx64K (Rate)
FULL (UNFRAMED)	-----	-----	1~4
PCM31 PCM31C	31	1	1~5
	30	1~2	1~6
	29	1~3	1~7
	28	1~4	1~8
	27	1~5	1~9
	26	1~6	1~10
	25	1~7	1~11
	24	1~8	1~12
	23	1~9	1~13
	22	1~10	1~14
	21	1~11	1~15
	20	1~12	1~16
	19	1~13	1~17
	18	1~14	1~18
	17	1~15	1~19
	16	1~16	1~20
	15	1~17	1~21
	14	1~18	1~22
	13	1~19	1~23
	12	1~20	1~24
	11	1~21	1~25
	10	1~22	1~26
	9	1~23	1~27
	8	1~24	1~28
	7	1~25	1~29
	6	1~26	1~30
	5	1~27	1~31
	4	1~28	1~32
	3	1~29	1~33
	2	1~30	1~34

	1	1~31	1~35
PCM30 PCM30C	30	1	1~6
	29	1~2	1~7
	28	1~3	1~8
	27	1~4	1~9
	26	1~5	1~10
	25	1~6	1~11
	24	1~7	1~12
	23	1~8	1~13
	22	1~9	1~14
	21	1~10	1~15
	20	1~11	1~16
	19	1~12	1~17
	18	1~13	1~18
	17	1~14	1~19
	16	1~15	1~20
	15	1~15,17	1~21
	14	1~15,17~18	1~22
	13	1~15,17~19	1~23
	12	1~15,17~20	1~24
	11	1~15,17~21	1~25
	10	1~15,17~22	1~26
	9	1~15,17~23	1~27
	8	1~15,17~24	1~28
	7	1~15,17~25	1~29
	6	1~15,17~26	1~30
	5	1~15,17~27	1~31
	4	1~15,17~28	1~32
	3	1~15,17~29	1~33
	2	1~15,17~30	1~34
	1	1~15,17~31	1~35

Table of E1+ Serial interface and E1+Ethernet interface mode (Annex F /G):

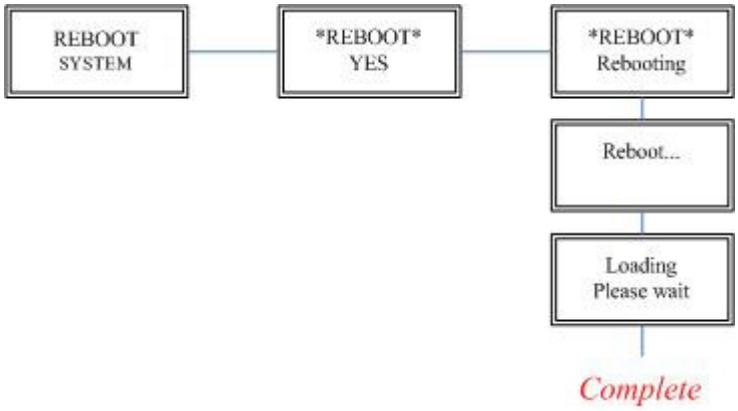
E1 interface			Serial interface Ethernet interface
Channel	Number of slot	1st slot	Nx64K (Rate)
FULL (UNFRAMED)	-----	-----	1~57
PCM31 PCM31C	31	1	1~58
	30	1~2	1~59
	29	1~3	1~60
	28	1~4	1~61
	27	1~5	1~62
	26	1~6	1~63
	25	1~7	1~64
	24	1~8	1~65
	23	1~9	1~66
	22	1~10	1~67
	21	1~11	1~68
	20	1~12	1~69
	19	1~13	1~70
	18	1~14	1~71
	17	1~15	1~72
	16	1~16	1~73
	15	1~17	1~74
	14	1~18	1~75
	13	1~19	1~76
	12	1~20	1~77
	11	1~21	1~78
	10	1~22	1~79
	9	1~23	1~80
	8	1~24	1~81
	7	1~25	1~82
	6	1~26	1~83
	5	1~27	1~84
	4	1~28	1~85
	3	1~29	1~86
	2	1~30	1~87

	1	1~31	1~88
PCM30 PCM30C	30	1	1~59
	29	1~2	1~60
	28	1~3	1~61
	27	1~4	1~62
	26	1~5	1~63
	25	1~6	1~64
	24	1~7	1~65
	23	1~8	1~66
	22	1~9	1~67
	21	1~10	1~68
	20	1~11	1~69
	19	1~12	1~70
	18	1~13	1~71
	17	1~14	1~72
	16	1~15	1~73
	15	1~15,17	1~74
	14	1~15,17~18	1~75
	13	1~15,17~19	1~76
	12	1~15,17~20	1~77
	11	1~15,17~21	1~78
	10	1~15,17~22	1~79
	9	1~15,17~23	1~80
	8	1~15,17~24	1~81
	7	1~15,17~25	1~82
	6	1~15,17~26	1~83
	5	1~15,17~27	1~84
	4	1~15,17~28	1~85
	3	1~15,17~29	1~86
	2	1~15,17~30	1~87
	1	1~15,17~31	1~88

3.6 Sub-menu tree for REBOOT SYSTEM

REBOOT SYSTEM -> * REBOOT * YES -> press ”ENTER” key

Some setting must reboot the device after the “Save Configuration”, and then setting items can take effect.



3.7 Sub-Menu tree for DISGNOSTIC

3.7.1. Loopback function

SYSTEM DIAGNOSTIC ➔ DIAG LOOPBACK

Note : No SYSTEM DIAGNOSTIC menu on Ethernet Interface Model

If the device haven't connect or under handshake, there will not have farend line, farend payload and V.54.

Stand alone NTU, no connection with other NTU:

E1 interface CO side
Local digital
Local
Remote line
Remote payload

Serial interface CO side
Local digital
Local
Remote line
Remote payload

E1 interface CPE side
Local digital
Remote line
Remote payload

Serial interface CPE side
Local digital
Remote line
Remote payload

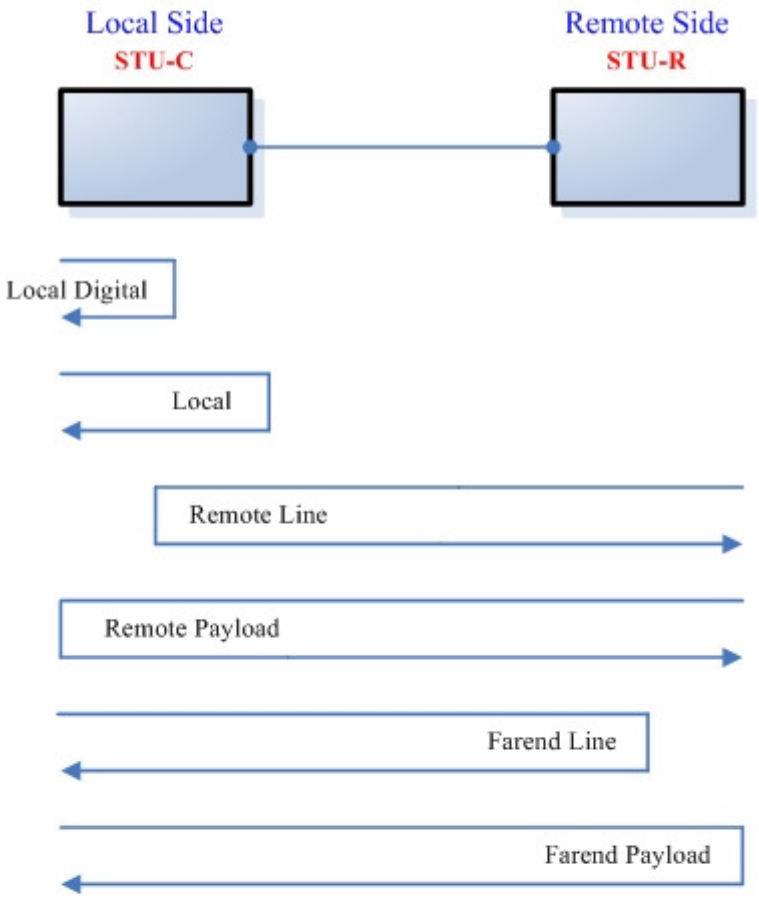
After connection both CO side and CPE side:

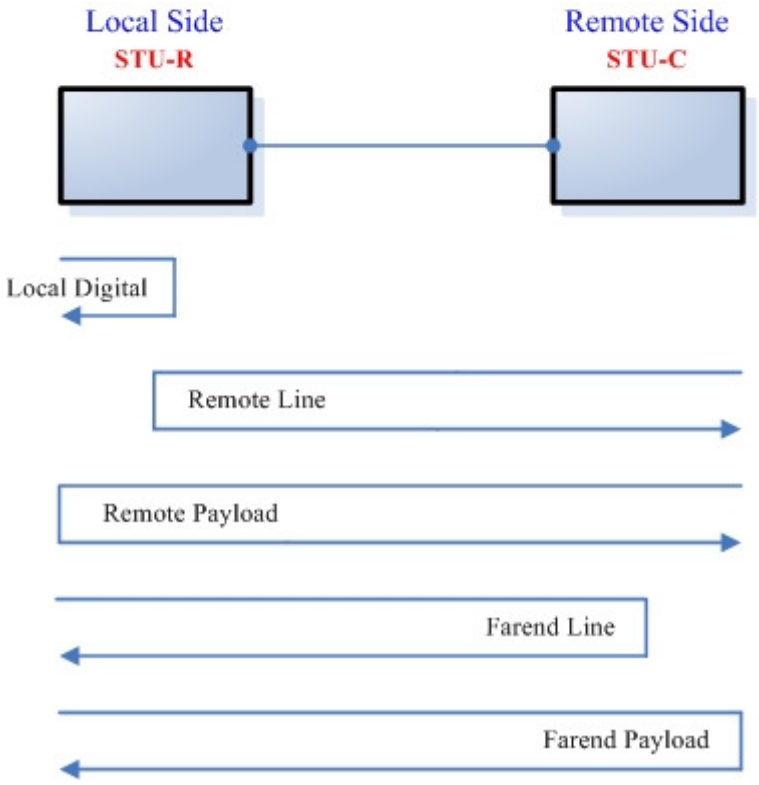
E1 interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload

Serial interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload
V.54

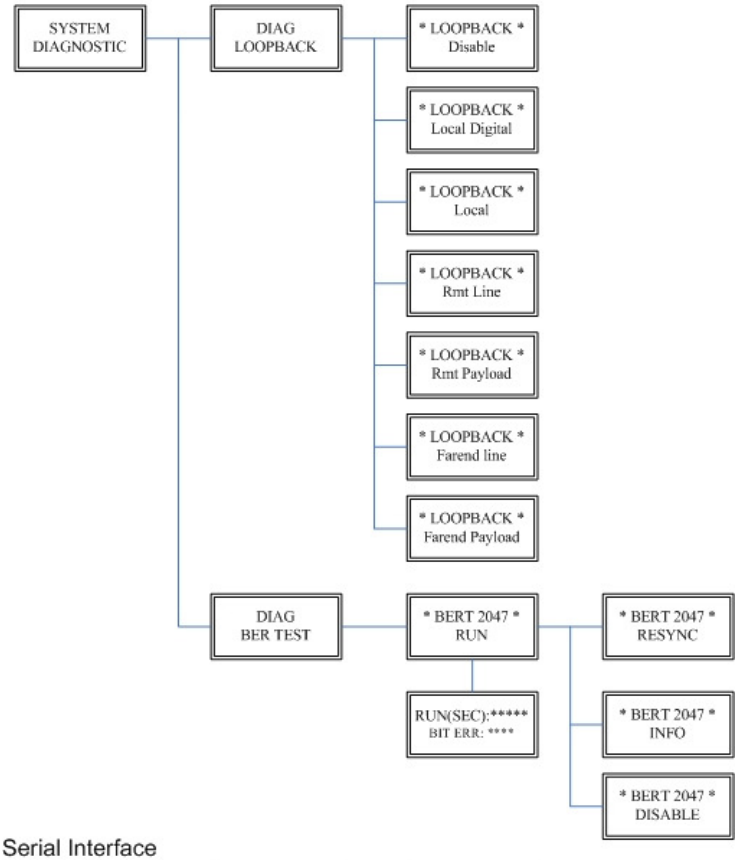
E1 interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload

Serial interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload
V.54

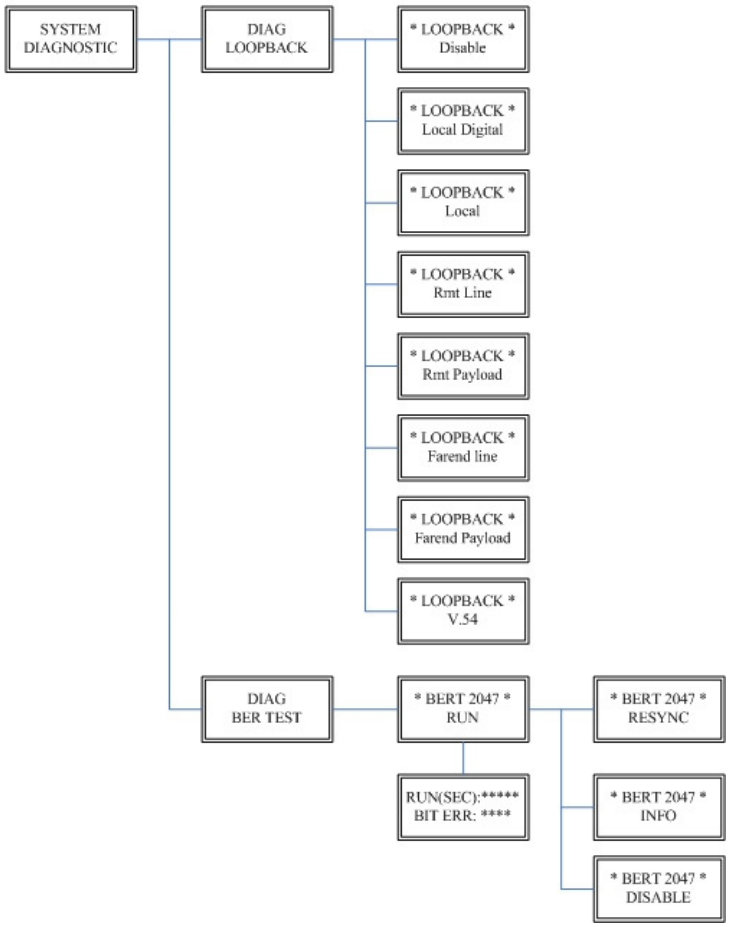

Local Side
STU-C
Remote Side
STU-R
Local Digital
Local
Remote Line
Remote Payload
Farend Line
Farend Payload


Local Side
STU-R
Remote Side
STU-C
Local Digital
Remote Line
Remote Payload
Farend Line
Farend Payload

E1 Interface


SYSTEM DIAGNOSTIC
DIAG LOOPBACK
* LOOPBACK * Disable
* LOOPBACK * Local Digital
* LOOPBACK * Local
* LOOPBACK * Rmt Line
* LOOPBACK * Rmt Payload
* LOOPBACK * Farend line
* LOOPBACK * Farend Payload
DIAG BER TEST
* BERT 2047 * RUN
* BERT 2047 * RESYNC
RUN(SEC):***** BIT ERR: ****
* BERT 2047 * INFO
* BERT 2047 * DISABLE

Serial Interface


SYSTEM DIAGNOSTIC
DIAG LOOPBACK
* LOOPBACK * Disable
* LOOPBACK * Local Digital
* LOOPBACK * Local
* LOOPBACK * Rmt Line
* LOOPBACK * Rmt Payload
* LOOPBACK * Farend line
* LOOPBACK * Farend Payload
* LOOPBACK * V.54
DIAG BER TEST
* BERT 2047 * RUN
* BERT 2047 * RESYNC
RUN(SEC):***** BIT ERR: ****
* BERT 2047 * INFO
* BERT 2047 * DISABLE

3.7.2. BER Test function

SYSTEM DIAGNOSTIC ➔ DIAG BER TEST

This is the internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any external test equipment.
This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern.

DIAG BER TEST

BERT 2047 RUN

When the BERT haven't any Bit Error, it show zero. Otherwise, it will show some number counter.
RUN(SEC) item is show the time elapsed second count

RUN(SEC): 00001 BIT ERR: 00000

If there have NO SYNC on bit error message, it shows the testing paths haven't connected.

RUN(SEC): 00001 BIT ERR: NO SYNC

Press ENTER key on this display message, it will re-sync again.

BERT 2047 RESYNC

Press ENTER key on this display message, it will show the test real time.

BERT 2047 INFO

If you want to exit the BERT, please press ENTER key from this display message.

BERT 2047 DISABLE

4. Configuration with Console Port

This chapter will deal with the specifics of configuration and operation of this product via console port with terminal emulation program. The configuration G.SHDSL .Bis NTU is performed via a menu-driven embedded software, using a standard ASCII terminal or a PC running a terminal emulation application connected to the rear panel CONSOLE port.
Windows includes a terminal emulation program called HyperTerminal. Connect the appropriate communication port from the PC to this device. After the physical connection is made, you are ready to configure this product. Make sure you have connected the supplied RS-232C serial cable (DB9F to RJ-45 Plug) to the console port on the rear panel on this product.
Run the terminal emulation program such as Hyper Terminal with the following setting:
Emulation: VT-100 compatible
Band rate: 115200 , Data bits: 8, Parity: None , Stop Bits:1 , Flow Control: None

4.1 Login Procedure

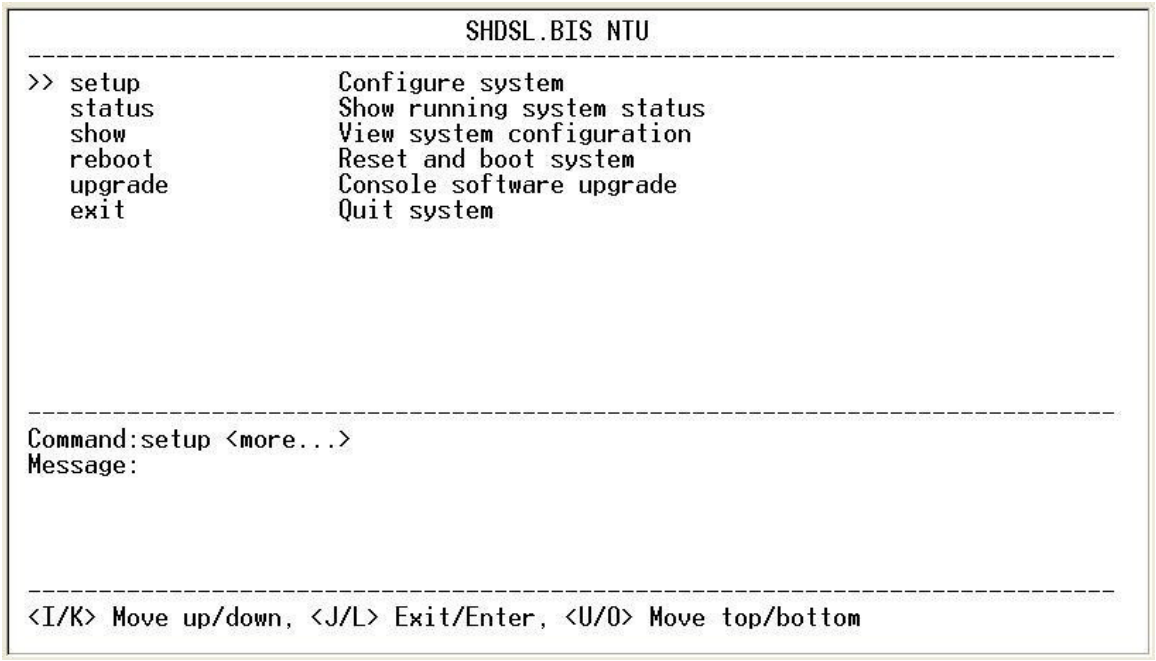
At the start up screen, you will see:

DownLoad FPGA Code 0000f17d/0000f17d...Ok
SHDSL.bis (Ethernet) Interface, STU_R Mode
Model = 5030B Software Version = 1.00.07 FPGA Version = 0.87
MCSV 14D2-0000-09713A88 / 14D2-0000-10013B4E
Load SDFE4 FW...
SDFE-4: Firmware download complete!
Press SPACE key to enter console mode configuration!

Press the SPACE key until the login screen appears. When you see the login screen, you can logon to device. Username use “**admin**”. When the system prompts you for a password, type “**admin**” to enter is O.K.

4.2 Window structure

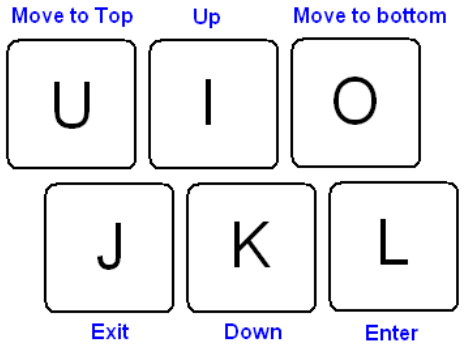
After you type the password, there will displays the main menu.



Above screen capture shows the common structure for all windows used throughout the configuration console terminal.
From top to bottom, the window is divided into four major sections.
The very top line displays the product name.
Next a block of commands is listed where the ">>" symbol indicates the current cursor placeholder.
The next block down is the "command" section. The command that is selected and ready for execution is displayed after the "Command:" prompt. The "<more…> designation indicates that there are other sub menus to this command. The "Message:" field is used to display any special system messages or warnings.
Finally, at the very bottom of the screen is a help command line and reminder of the currently available command keys. In most cases, the keyboards four cursor keys can be used to navigate all the menu system. If for some reason your keyboard's cursor keys are not supported in the terminal emulation software, you may uses the keys listed on the help command line.

Menu Commands

Before changing the configuration, familiarize yourself with the operations list in the following table. The operation list will be shown on the window.



Keypads	Description
[UP] or **I**	Move to above field in the same level menu
[DOWN] or **K**	Move to below field in the same lever menu
U	Move to top field in the same level menu
O	Move to bottom field in the same level menu
[LEFT] or **J**	Move back to previous menu (Exit)
[RIGHT] or **L** [ENTER]	Move forward to submenu(Enter)
[TAB]	To choose another parameters
Ctrl + C	To quit the show data display screen

4.3 Main Menu Summary

The main menu is prompt as follow.

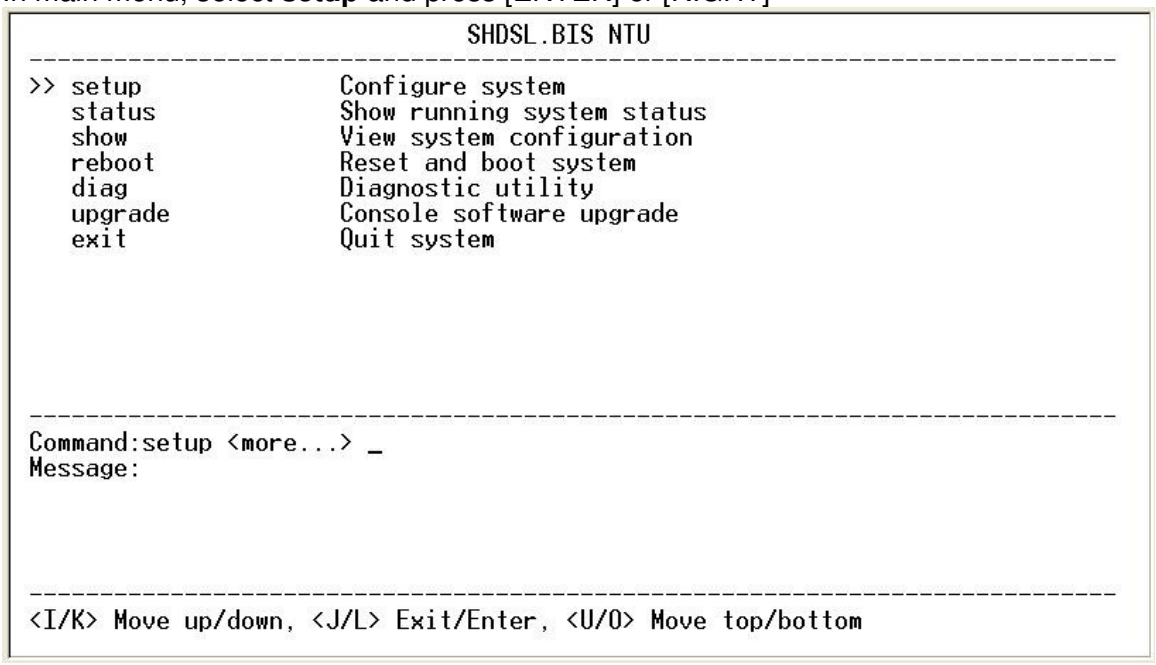
Menu Title	Function
Setup	Use this menu to setup SHDSL type, SHDSL parameters and E1 parameters or restore factory default setting.
Status	Use this menu to show SHDSL status, E1 /V.35/Ethernet status and statistics or clear the statistics
Show	Use this menu to show general information, all configurations and all configurations in command script.
Reboot	Use this menu to reset and reboot the system
Diag	Use this menu to setup diagnostic utility
Upgrade	Use this menu to upgrade kernel and FPGA.
Exit	Use this menu to exit

No diagnostic function on main menu for two case:
(1) Use Ethernet interface model.
(2) Use Three interface in one model, but working as Ethernet interface only.

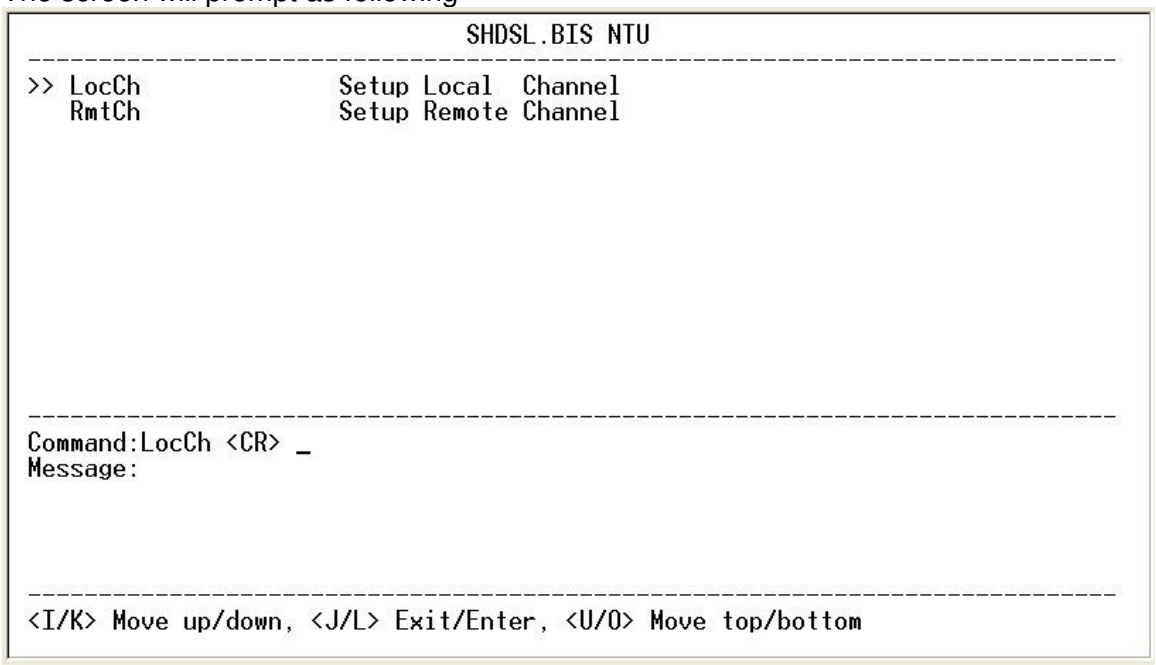
4.4 Configuration

This section provides information about configuration the SHDSL .Bis NTU. Follow the procedures:

In main menu, select **setup** and press [ENTER] or [RIGHT]



The screen will prompt as following



If you setup the local side, select **LocCH** and press [ENTER] or [RIGHT].

Otherwise, setup the remote side by select **RmtCH.**

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
>> Interface          Configute NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.4.1. Configure NTU Interface

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
>> Interface          Configute NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Serial             Configure Serial Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

SHDSL Interface (TAB Select) <E1+Serial>: E1+Serial


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

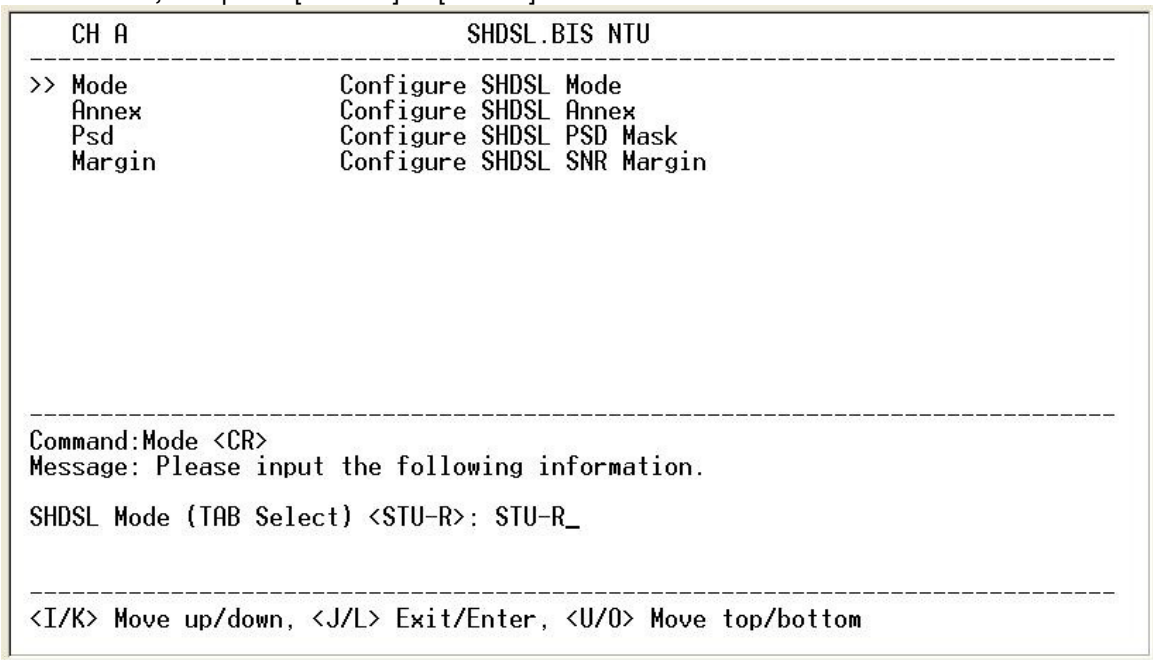
If the SHDSL .bis NTU is the three interfaces in one model, it will display five types of interface can select.

Model	Interface modes support
E1 interface model	E1
Serial interface model	Serial
Ethernet interface model	Ethernet
Three interface in one model	E1
	Serial
	Ethernet
	E1+Serial
	E1+Ethernet

4.4.2. Configure SHDSL parameters

This section provide to setup SHDSL parameters: **SHDSL Mode**, **Annex type**, **Psd Mask**, **SNR margin**.

Select **Shdsl,** and press [ENTER] or [RIGHT].


CH A SHDSL.BIS NTU
>> Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Command:Mode <CR>
Message: Please input the following information.
SHDSL Mode (TAB Select) <STU-R>: STU-R_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Press [TAB] to select the operating type and press enter to finish setting.

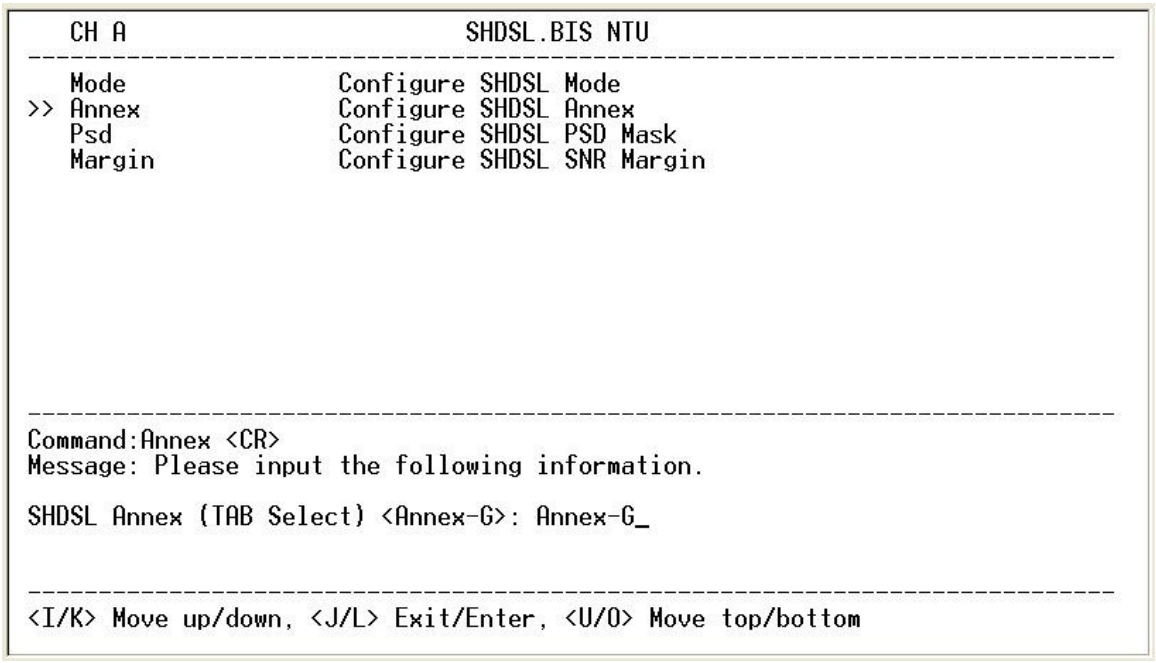
The SHDSL modes have three types: **STU-R**, **STU-C-INTCLK**, **STU-C-EXTCLK**

INTCLK: The device will generate the appropriate clock speed defined by the speed setting of the interface.

EXTCLK: The device will accept the clock from the interface and will use that clock to receive and transmit data across the interface.

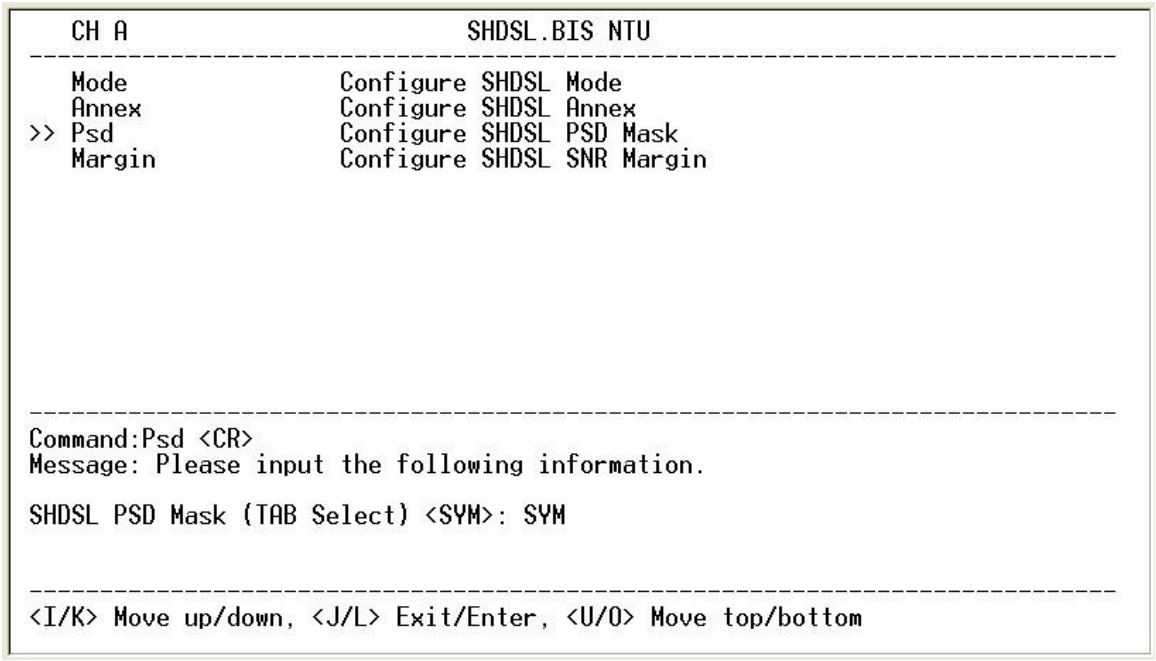
Most applications use Internal Clock. If the DTE provides a clock with TX data, the clock can set to be External Clock.

For setting the SHDSL Annex type, move the cursor to **Annex** and press [ENTER]. Select the annex type by using [TAB] key.


CH A SHDSL.BIS NTU
Mode Configure SHDSL Mode
>> Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Command:Annex <CR>
Message: Please input the following information.
SHDSL Annex (TAB Select) <Annex-G>: Annex-G_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

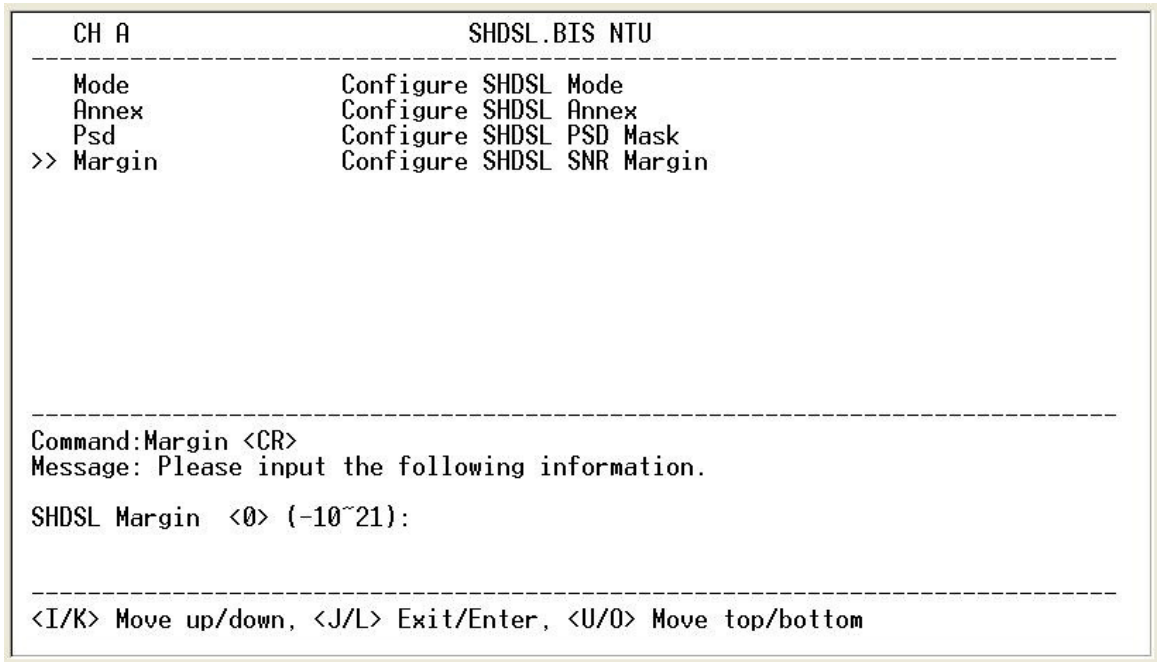
The Annex have four mode: A, B, F and G.

For configuring SHDSL PSD, move the cursor to **psd** and press [ENTER]. Select the parameter via [TAB] key.


CH A SHDSL.BIS NTU
Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
>> Psd Configure SHDSL PSD Mask
Margin Configure SHDSL SNR Margin
Command:Psd <CR>
Message: Please input the following information.
SHDSL PSD Mask (TAB Select) <SYM>: SYM
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The PSD have two types: SYM and ASYM.

For setting SHDSL Margin, move the cursor to **margin** and press [ENTER]. Select the margin via [TAB] key and key in the Next margin.

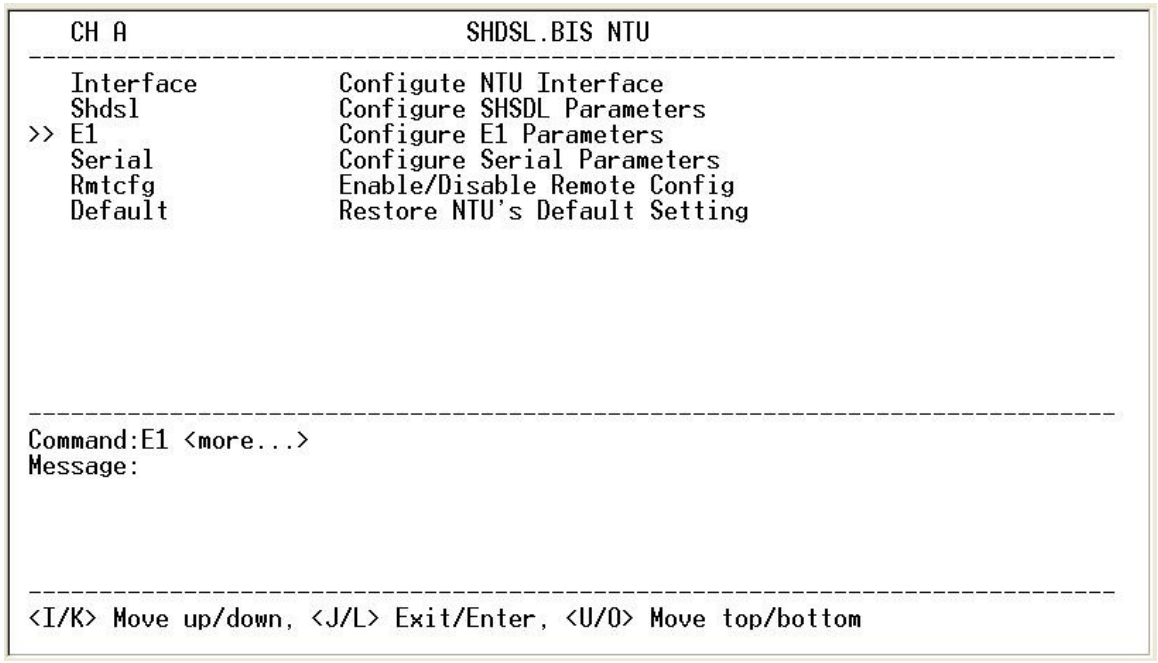

CH A SHDSL.BIS NTU
Mode Configure SHDSL Mode
Annex Configure SHDSL Annex
Psd Configure SHDSL PSD Mask
>> Margin Configure SHDSL SNR Margin
Command:Margin <CR>
Message: Please input the following information.
SHDSL Margin <0> (-10~21):
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

SNR margin is an index of line connection. You can see the actual SNR margin in STATUS SHDSL. The larger SNR margin has the better line connection. For example, if you set SNR margin in the field as 3, the SHDSL connection will drop down and reconnect when the SNR margin is lower than 3.

The setting range is -10 to 21.

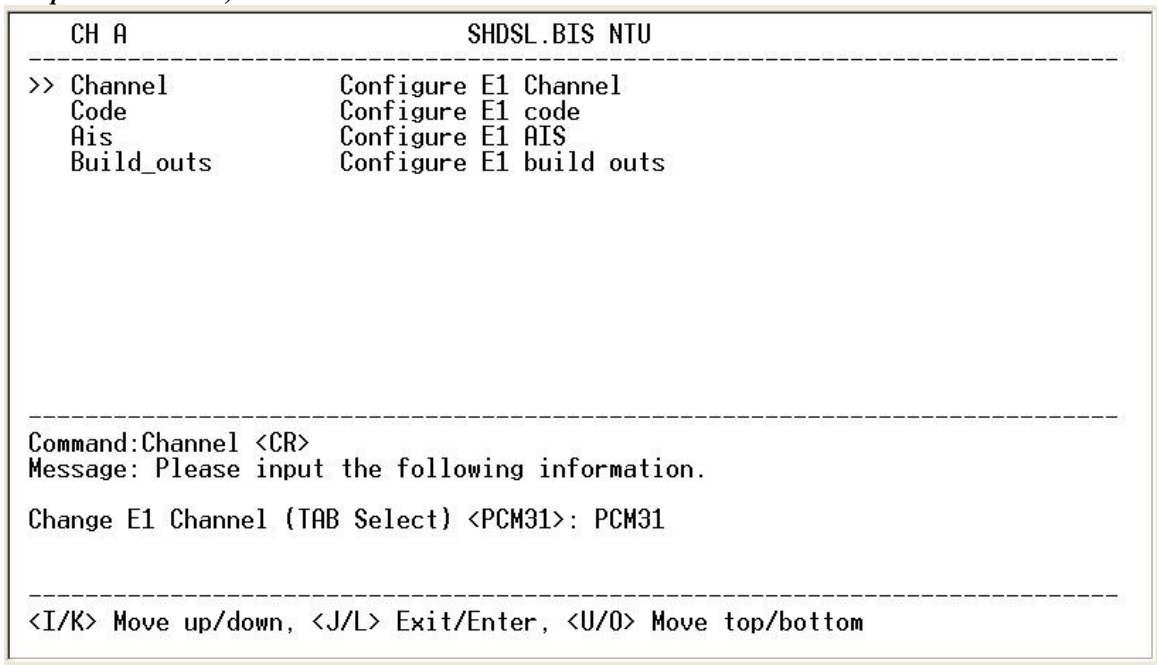
4.4.3. Configure E1 parameters

When using on E1 interface, select the E1 item and press [ENTER] or [RIGHT].



The E1 settings include the Channel (frame mode), line code, AIS and build out settings.

Setup E1 Parameter, Channel

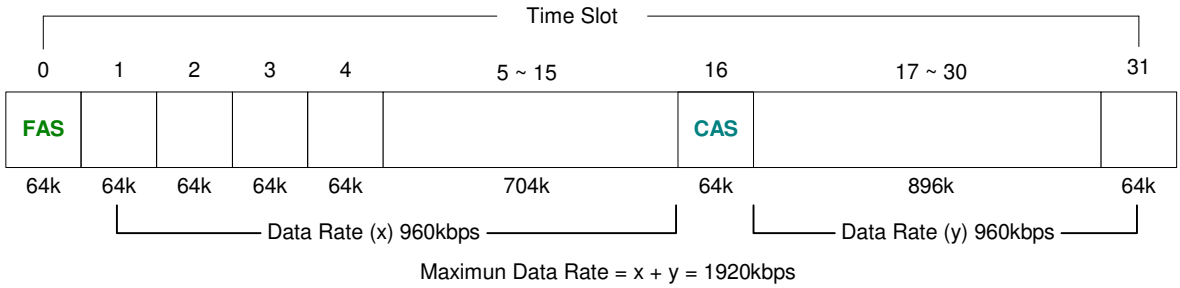

CH A SHDSL.BIS NTU
>> Channel Configure E1 Channel
Code Configure E1 code
Ais Configure E1 AIS
Build_outs Configure E1 build outs
Command:Channel <CR>
Message: Please input the following information.
Change E1 Channel (TAB Select) <PCM31>: PCM31
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Framing is required to recover the channelized E1. In transparent operation, the framing is configured as Unframed. In this case the G.SHDSL framer must be set to Nx64 with N=32. For any framing such as FAS or CAS, the G.SHDSL framer must be set to E1, then the E1 framing here may be set accordingly.

PCM31	FAS
PCM31C	FAS+CRC4
PCM30	FAS+CAS
PCM30C	FAS+CAS+CRC4
FULL	Unframed

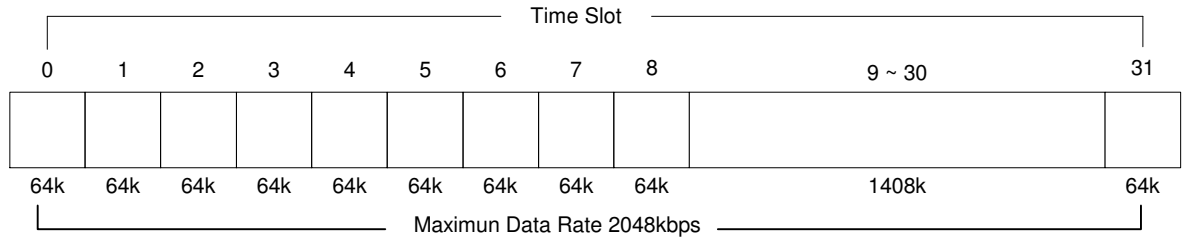
FAS — Frame Alignment Signal use 7-bit pattern to establish and maintain frame synchronization. The FAS word is located in timeslot 0 of frame. In FAS mode there are 1~31 timeslot available for use data.

CAS — Also known as time slot 16 multiframing. It requires a multiframe alignment signal to be present for frame sync. The Multiframe Alignment Signal (MFAS) is inserted into the 16th timeslot of frame 0 of the 16-frame multiframe.
In CAS mode, there are 30 channels available for user data. If timeslot 16 is included in the unit's mapping, it will be disregarded.

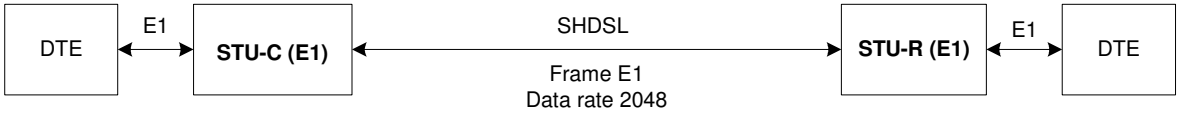


CRC4 — The CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also the received signal is checked for errors.
CRC-4 checksum cannot be sent in unframed mode.

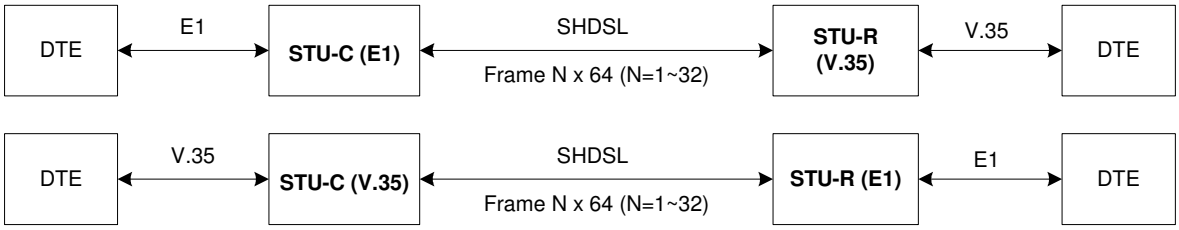
Unframed — In this mode, user data is inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without framing is to utilize the full bandwidth of the E1 line.



ITU 991.2 (2004) (G.SHDSL .Bis) supports data rate up to 56964Kbps, but G.703 (E1) only supports data rate of 2048kbps so the maximum data rate of SHDSL line, connected with E1 DCEs, depends on data rate of E1, 2048kbps. There are two types of frames on SHDSL line, E1 and N x 64k. E1 frame only use for connection with E1 DCEs.



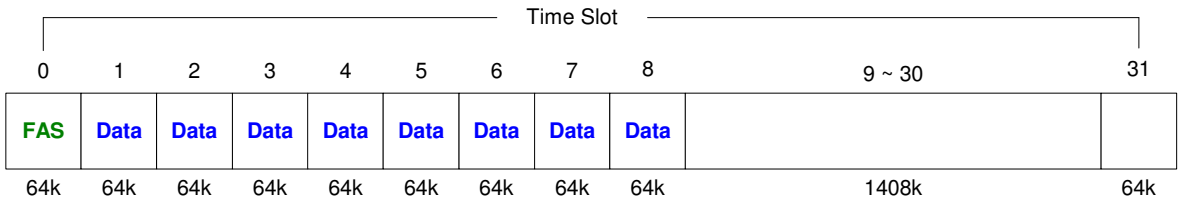
If the connection is E1 vs V.35 or V.35 vs E1, the frame has to be used N x 64k. In this case, the data rate depends on value of N. Same as above case, SHDSL and V35 can support 2304kbps data rate (36 x 64k) but E1 supports maximum data rate of 2048kbps (32 x 64k).



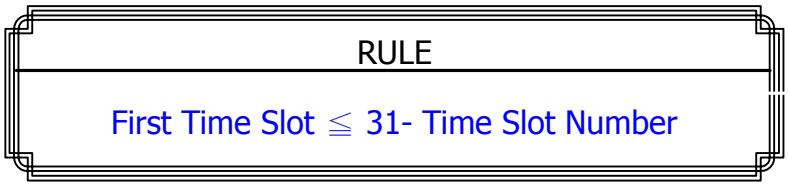
Time slot, N value, is place of data in the frame. Time Slot Number 1~31 (N=1~31) is Fractional E1 and Time Slot Number 32 (N=32) is unframed.

Fractional E1

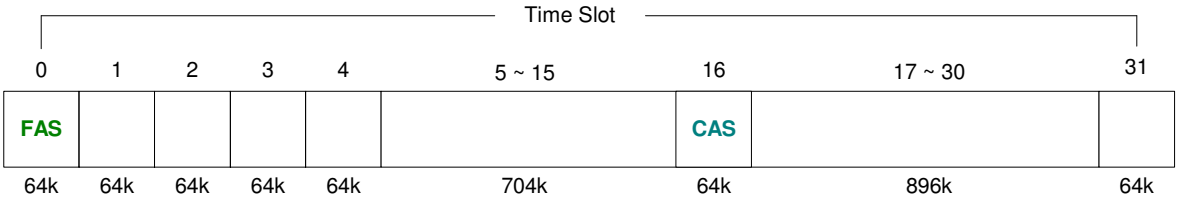
For fractional E1, FE1, the data rate is from 64k, N=1, to 1984k, N=31, according to the E1 frame. If the E1 frame is FAS or FAS+CRC4, there are 1~31 available time slot for use data. If the data rate of SHDSL line set to be 512k, the time slot number is 8 and first time slot number is 1. The frame is shown as below.



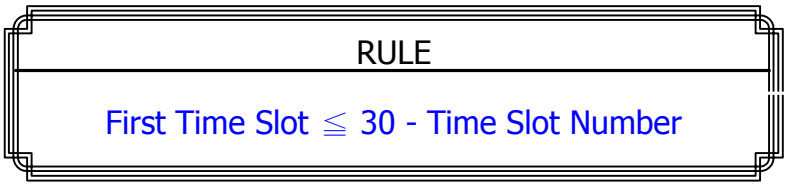
The First Time Slot setting of FAS and FAS+ CRC4 have to follow the rule:



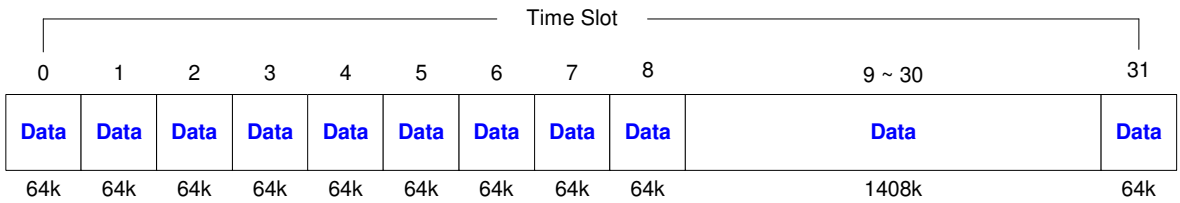
Using E1 frame of FAS+CAS or FAS+CAS+CRC4, the FAS will occupy Time Slot 0 and CAS Time Slot 16. There are only 30 Time Slot left for data. On the other hand, the data rate is 1920kbps.



The First Time Slot setting of FAS+CAS and FAS+CAS+CRC4 have to follow the rule:



Unframed E1



Setup E1 Parameter, Line Code

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Channel             Configure E1 Channel
>> Code                Configure E1 code
   Ais                 Configure E1 AIS
   Build_outs          Configure E1 build outs









--------------------------------------------------------------------------------
Command:Code <CR>
Message: Please input the following information.

Change E1 Line Code (TAB Select) <HDB3>: HDB3_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The G.SHDSL .Bis NTU supports two different line codings. HDB3 is the most popular and preferred line coding and is also the default setting. AMI line coding is also selectable.

`

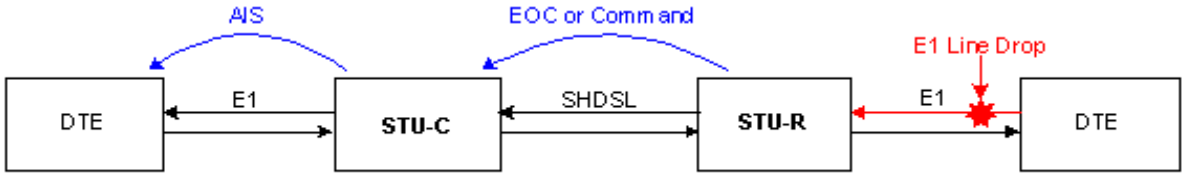
HDB3	In this line coding, the transmitter substitutes a deliberate bipolar violation when excessive zeros in the data stream are detected. The receiver recognizes these special violations and decodes them as zeros. This method enables the network to minimum pulse density requirements. Unless AMI is required for your application, HDB3 should be used whenever possible.
AMI	Alternate Mark Inversion defines a pulses as a “mark,” a binary one as, as opposed to a zero. In an E1 network connection, signals are transmitted as a sequence of one and zero. One is sent as pulse, and zero is sent as spaces, i.e. no pulse. Every other pulse is inverted from the previous pulse in polarity, so that the signal can be effectively transmitted. This means, however, that a long sequence of zero in data stream will cause problems, since the NTU receiving the signal relies on the signal to recover the 2048kbps clock.

Setup E1 Parameter, AIS

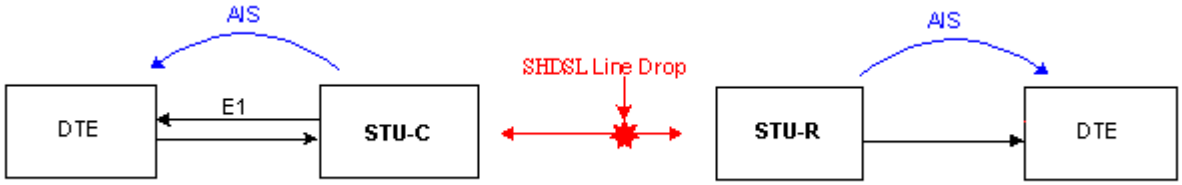
```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Channel             Configure E1 Channel
   Code                Configure E1 code
>> Ais                 Configure E1 AIS
   Build_outs          Configure E1 build outs









--------------------------------------------------------------------------------
Command:Ais <CR>
Message: Please input the following information.

Change E1 Ais (TAB Select) <Off>: Off


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

AIS (Alarm Indication Signal) is a method to inform the remote connection that there is a signal or sync problem with the E1. AIS is only valid in framed mode E1, not in Unframed E1. The setting here of AIS enabled (on) or not (off) and is for testing with AIS. When enabled, the E1 will transmit the AIS and it should be confirmed at the remote device (AIS indication lit). After testing, please turn AIS back off.

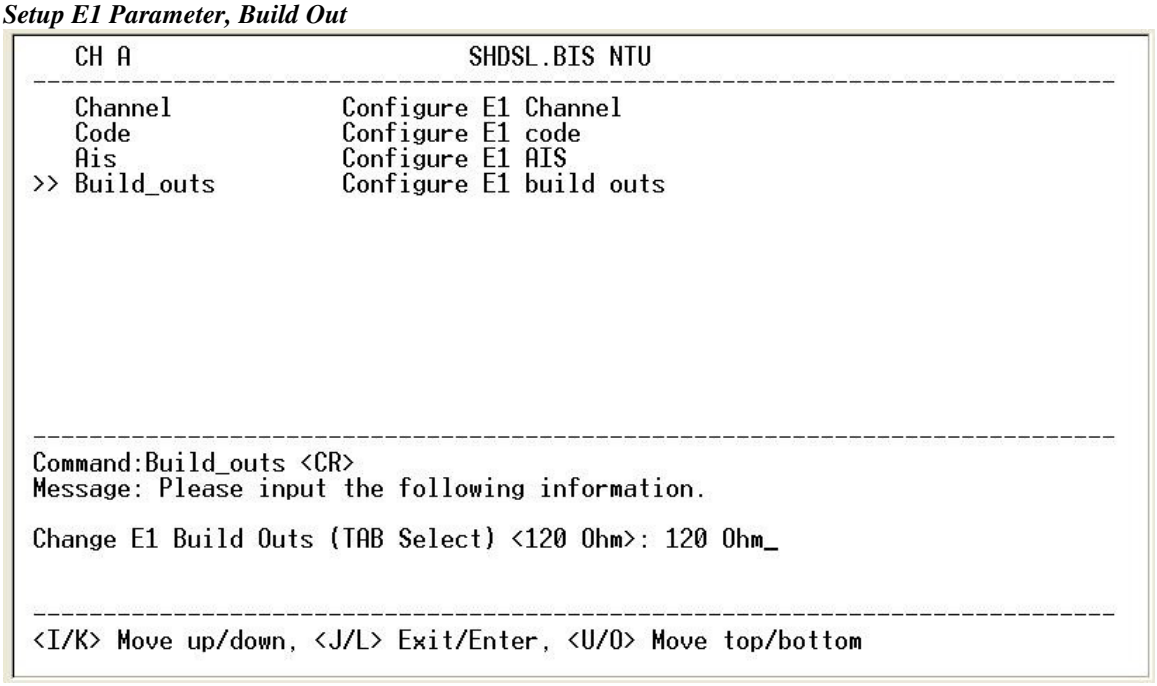
- For example 1: When STU-R E1 RX line is drop, STU-R sends the status to STU-C via EOC or command, and then STU-C will send AIS (Alarm Indication Signal) to DTE while AIS function is enabled.



- For example 2: When SHDSL connection drops, STU-R and STU-C both send AIS (Alarm Indication Signal) to DTE in the same time while AIS function is enabled.



Setup E1 Parameter, Build Out


CH A SHDSL.BIS NTU
Channel Configure E1 Channel
Code Configure E1 code
Ais Configure E1 AIS
>> Build_outs Configure E1 build outs
Command:Build_outs <CR>
Message: Please input the following information.
Change E1 Build Outs (TAB Select) <120 Ohm>: 120 Ohm_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

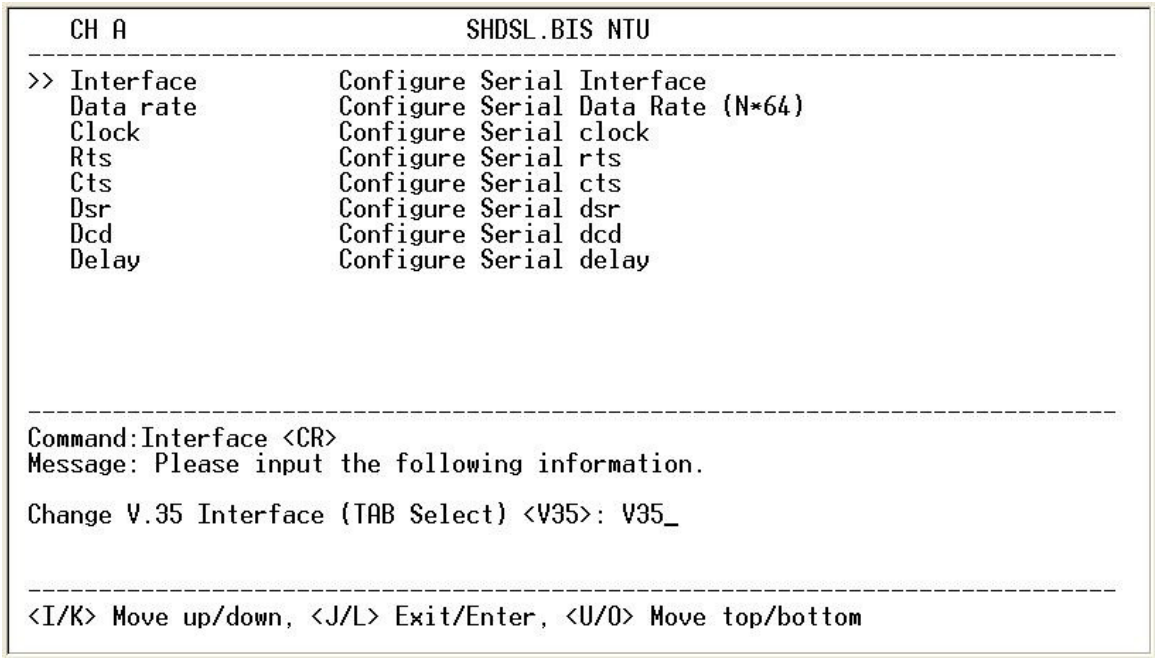
The SHDSL.Bis NTU can support both unbalanced E1 at 75 ohms and balanced E1 at 120 ohms.

The settings for impedance are made here under the build out menu setting.

4.4.4. Configure Serial parameters

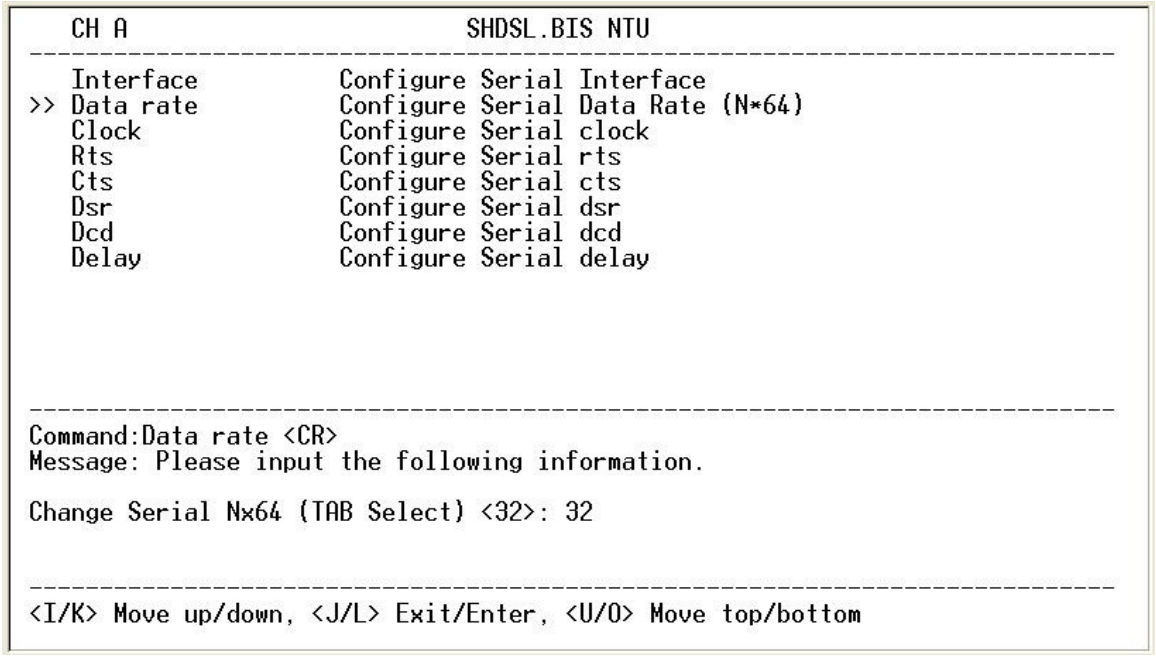
When using on Serial interface, select the Serial item and press [ENTER] or [RIGHT].
The serial settings include the data rate, clocking and handshaking lines setup.

Setup Serial Parameter, Interface


CH A SHDSL.BIS NTU
>> Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Rts Configure Serial rts
Cts Configure Serial cts
Dsr Configure Serial dsr
Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Interface <CR>
Message: Please input the following information.
Change V.35 Interface (TAB Select) <V35>: V35_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

There have two interfaces: V.35 and RS-530(X.21) can be setup.

Setup Serial Parameter, Data Rate


CH A SHDSL.BIS NTU
Interface Configure Serial Interface
>> Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Rts Configure Serial rts
Cts Configure Serial cts
Dsr Configure Serial dsr
Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Data rate <CR>
Message: Please input the following information.
Change Serial Nx64 (TAB Select) <32>: 32
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

For Annex A and B, the rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).

For Annex F and G, the rate can be adjusted in increments of 64kbps from 64kbps to 5696kbps (N=1~89).

Setup Serial Parameter, Clock Polarity

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
>> Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Clock <CR>
Message: Please input the following information.

Change Serial Clock (TAB Select) <normal>: normal


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

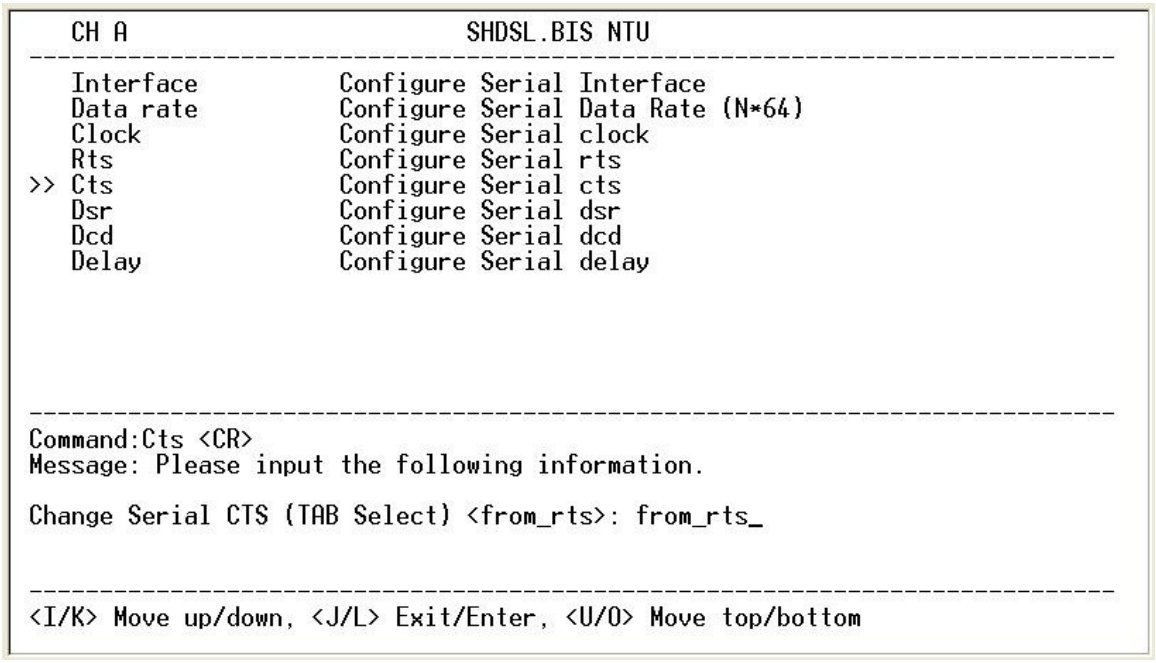
The data port clock polarity may be adjusted to solve some rare clocking issues. The default setting is 'Normal' clock polarity, where data is sent on the positive transition of the clock, while the option exists to set inverse clock polarity where data is sent on the negative clock transition.

Setup Serial Parameter, RTS

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
>> Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Rts <CR>
Message: Please input the following information.

Change Serial RTS (TAB Select) <on>: on


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

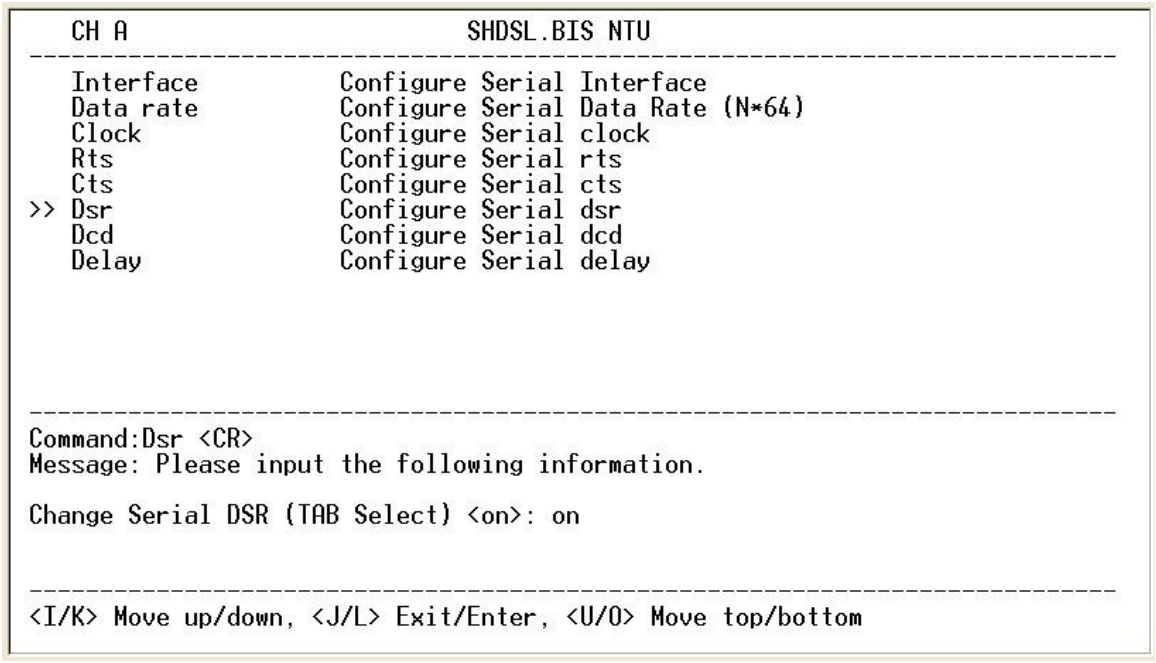
The behavior of the RTS (Request To Send) signal may be set in one of two ways. When set 'on', the RTS signal is always forced high (on, positive voltage or SPACE), when set 'from DTE' the RTS signal will follow the DTE's condition. The default setting for RTS is on.

Setup Serial Parameter, CTS


CH A SHDSL.BIS NTU
Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Rts Configure Serial rts
>> Cts Configure Serial cts
Dsr Configure Serial dsr
Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Cts <CR>
Message: Please input the following information.
Change Serial CTS (TAB Select) <from_rts>: from_rts_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

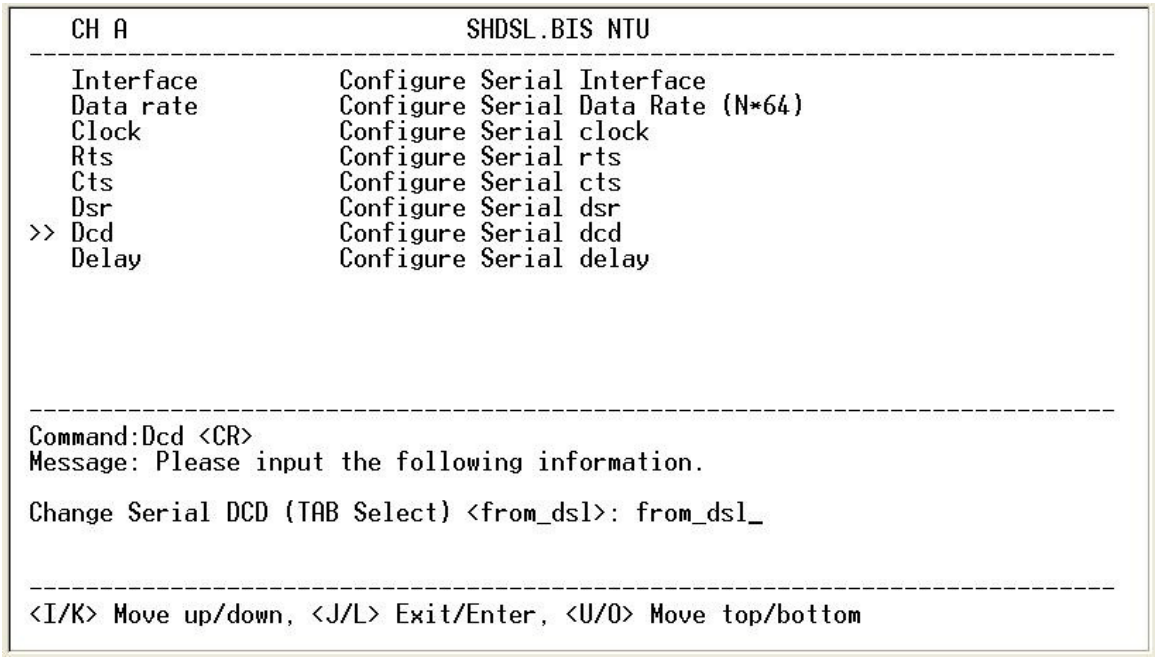
The behavior of the CTS (Clear To Send) signal may be set in one of three ways. When set 'on', the CTS signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or CTS will follow RTS (Request To Send) condition of 'on' for RTS on 'off' for RTS off. The default setting for CTS is to follow RTS.

Setup Serial Parameter, DSR


CH A SHDSL.BIS NTU
Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Rts Configure Serial rts
Cts Configure Serial cts
>> Dsr Configure Serial dsr
Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Dsr <CR>
Message: Please input the following information.
Change Serial DSR (TAB Select) <on>: on
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The behavior of the DSR (Data Set Ready) signal may be set in one of three ways. When set 'on', the DSR signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DSR will follow DTR (Data Terminal Ready) condition of 'on' for DTR on or 'off' for DTR off. The default setting for DSR is on.

Setup Serial Parameter, DCD


CH A SHDSL.BIS NTU
Interface Configure Serial Interface
Data rate Configure Serial Data Rate (N*64)
Clock Configure Serial clock
Rts Configure Serial rts
Cts Configure Serial cts
Dsr Configure Serial dsr
>> Dcd Configure Serial dcd
Delay Configure Serial delay
Command:Dcd <CR>
Message: Please input the following information.
Change Serial DCD (TAB Select) <from_dsl>: from_dsl_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The behavior of the DCD (Data Carrier Detect) signal may be set in one of three ways. When set 'on', the DCD signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DCD will follow the DSL condition of 'on' for DSL link or 'off' for no link. The default setting for DCD is to follow the DSL link status.

Setup Serial Parameter, Delay

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
>> Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Delay <CR>
Message: Please input the following information.

Change Serial Delay <3> (0~3):


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The delay setting is used to cause a delay for CTS to follow RTS. The delay setting may be set from 0 to 3 milliseconds. The default setting is 3 milliseconds.

4.4.5. Configure Ethernet parameter

When using on Ethernet interface mode, select the Ethernet item and press [ENTER] or [RIGHT].

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Interface          Configute NTU Interface
   Shdsl              Configure SHSDL Parameters
>> Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Ethernet <more...>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The Ethernet settings include the data rate, negotiation, duplex the speed.

Setup Interface Parameter, Data Rate

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
>> Rate                Configure Ethernet Data Rate(N*64K)
   Auto                Configure Ethernet Auto Config
   Duplex              Configure Ethernet Duplex
   Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Rate <CR>
Message: Please input the following information.

Change Ethernet Rate (TAB Select) <36>: 36


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For Annex A and B, the rate can be adjusted in increments of 64kbps from 64bps to 2304kbps (N=1~36).

For Annex F and G, the rate can be adjusted in increments of 64kbps from 64bps to 5696kbps (N=1~89).

Setup Interface Parameter, negotiation

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Rate                Configure Ethernet Data Rate(N*64K)
>> Auto                Configure Ethernet Auto Config
   Duplex              Configure Ethernet Duplex
   Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Auto <CR>
Message: Please input the following information.

Change Ethernet Auto Config  (TAB Select) <Enable>: Enable


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can select Enable and Disable on auto negotiation function.

Setup Interface Parameter, Duplex

```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Rate                Configure Ethernet Data Rate(N*64K)
   Auto                Configure Ethernet Auto Config
>> Duplex              Configure Ethernet Duplex
   Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>
Message: Please input the following information.

Change Ethernet Duplex  (TAB Select) <Full-Duplex>: Full-Duplex


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When auto negotiation setup to disable, there have select on duplex mode: Full-Duplex and Half-Duplex.

Setup Interface Parameter, Speed

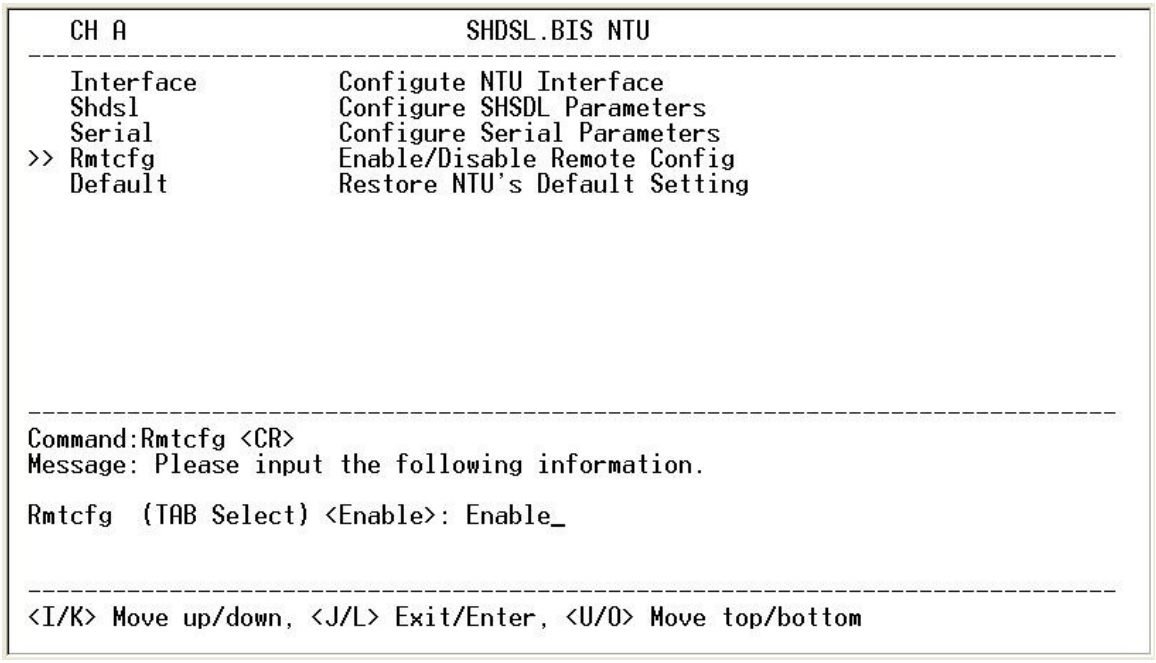
```
   CH A                          SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Rate                Configure Ethernet Data Rate(N*64K)
   Auto                Configure Ethernet Auto Config
   Duplex              Configure Ethernet Duplex
>> Speed               Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Speed <CR>
Message: Please input the following information.

Change Ethernet Speed (TAB Select) <100M>: 100M_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When auto negotiation setup to disable, there have select on speed setting: 10M and 100M.

If auto negotiation setup to Enable, the items **Duplex** and **Speed** can't been set. The message will display "Ethernet is in auto negotiate".

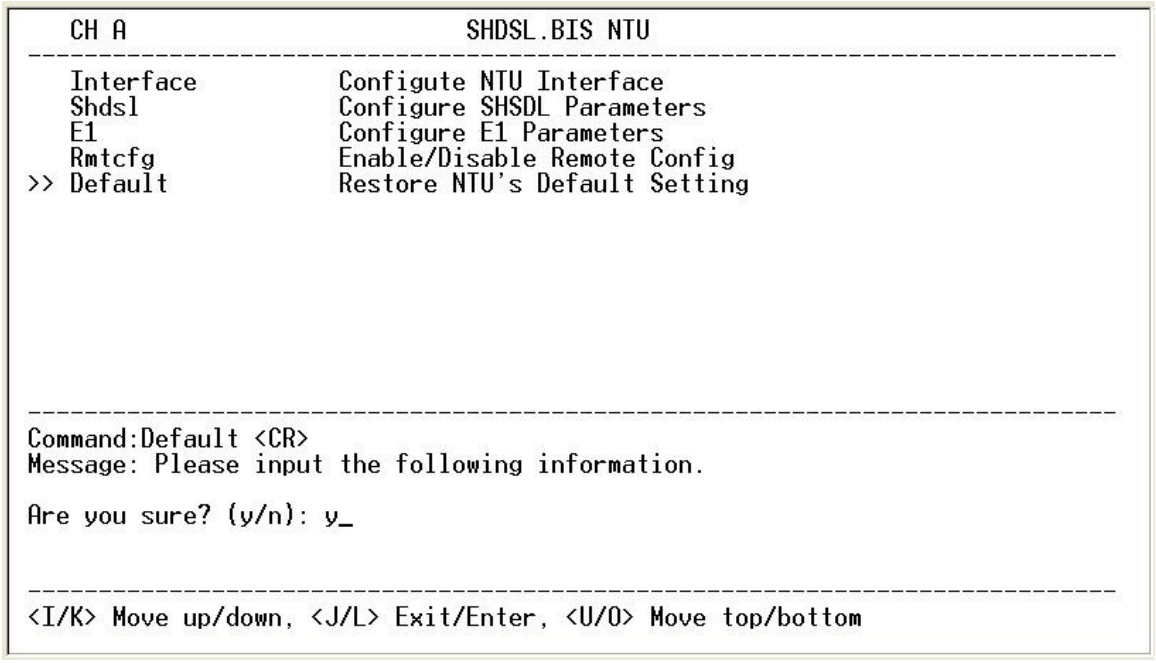
4.4.6. Remote configuration

You can set the “Enable/Disable function” to let the side remote side can configure parameters to this device remotely.


CH A SHDSL.BIS NTU
Interface Configute NTU Interface
Shdsl Configure SHSDL Parameters
Serial Configure Serial Parameters
>> Rmtcfg Enable/Disable Remote Config
Default Restore NTU's Default Setting
Command:Rmtcfg <CR>
Message: Please input the following information.
Rmtcfg (TAB Select) <Enable>: Enable_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

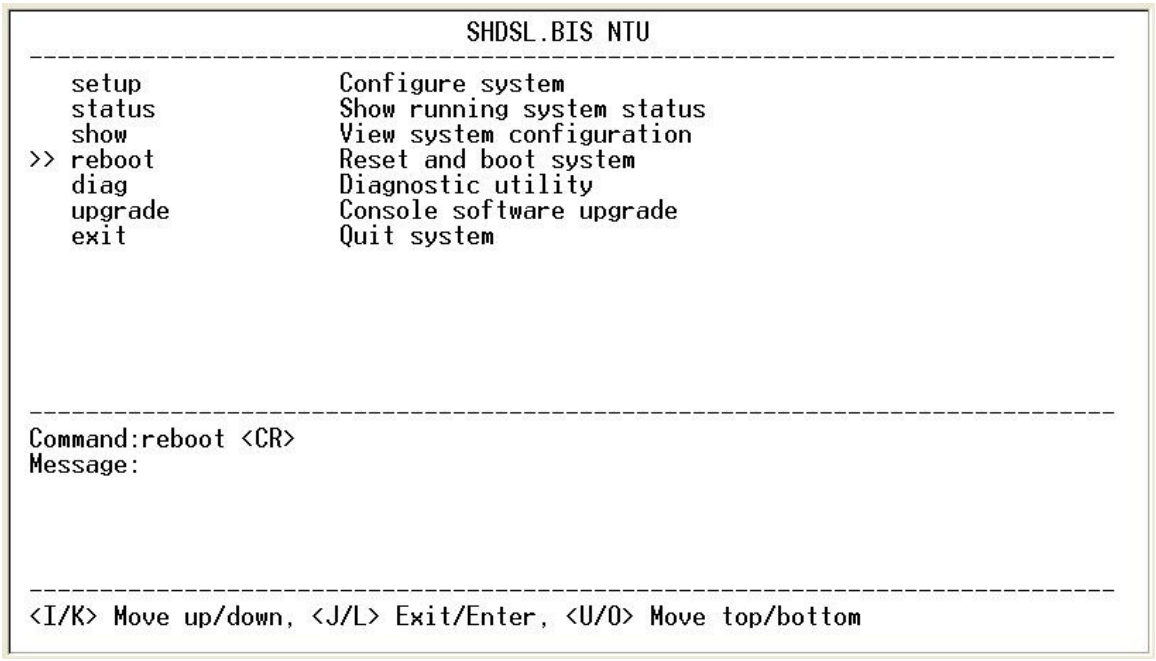
4.4.7. Restore factory default

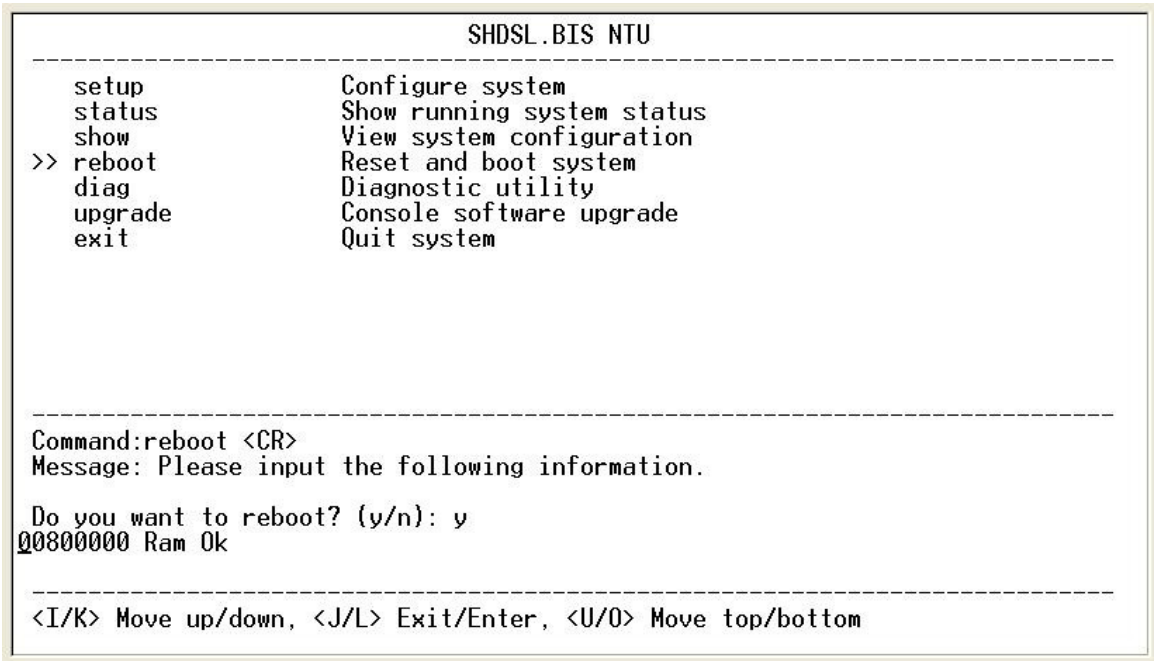
The G.SHDSL .Bis NTU can have all settings restored to their original factory settings simply by going to the setting menu, selecting the Default item, and then press ENTER. The system will ask for a y(es) or n(o) confirmation followed by an ENTER.


CH A SHDSL.BIS NTU
Interface Configute NTU Interface
Shdsl Configure SHSDL Parameters
E1 Configure E1 Parameters
Rmtcfg Enable/Disable Remote Config
>> Default Restore NTU's Default Setting
Command:Default <CR>
Message: Please input the following information.
Are you sure? (y/n): y_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

4.5 Reboot

In main menu, move the cursor to **reboot** and press [ENTER]. The device will reboot after confirming.




SHDSL.BIS NTU
setup Configure system
status Show running system status
show View system configuration
>> reboot Reset and boot system
diag Diagnostic utility
upgrade Console software upgrade
exit Quit system
Command:reboot <CR>
Message: Please input the following information.
Do you want to reboot? (y/n): y
00800000 Ram Ok
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

After the reboot operation have finished, RAM test are starting again.

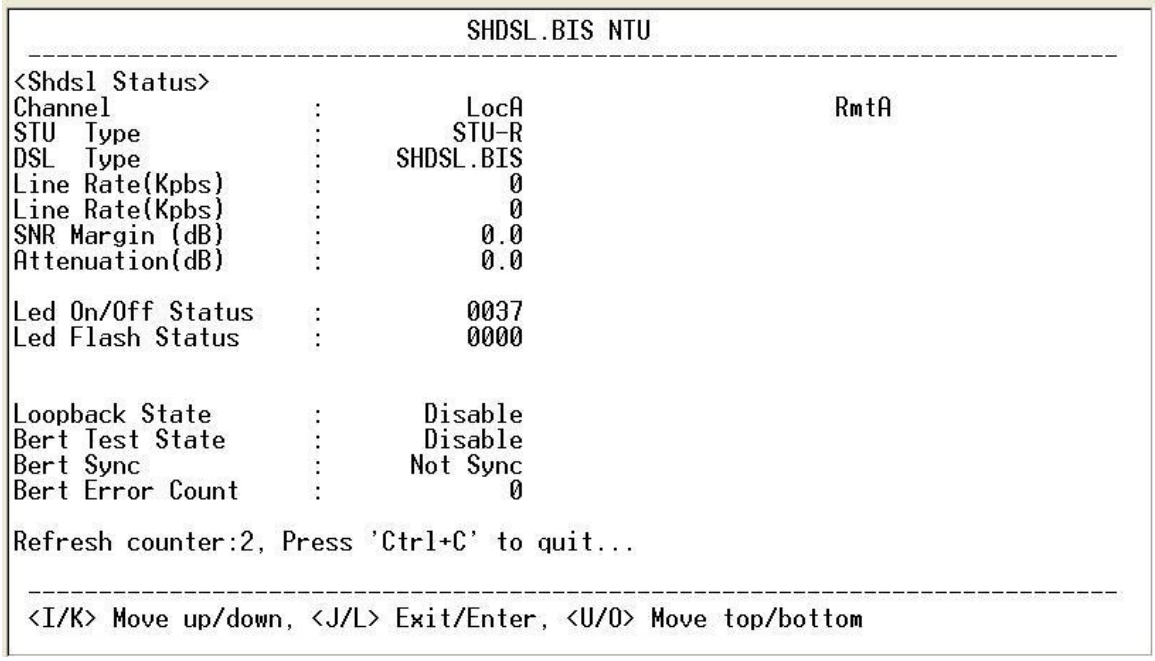
4.6 View the system status

You can use the status command to view the status of SHDSL, E1, Serial and Interface as well as statistic and clear the statistic log. Select **status** and press [ENTER].

```
                                SHDSL.BIS NTU
------------------------------------------------------------------------------
   setup                Configure system
>> status               Show running system status
   show                 View system configuration
   write                Update flash configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




------------------------------------------------------------------------------
Command:status <more...> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Select **SHDSL** command to show the status of SHDSL.

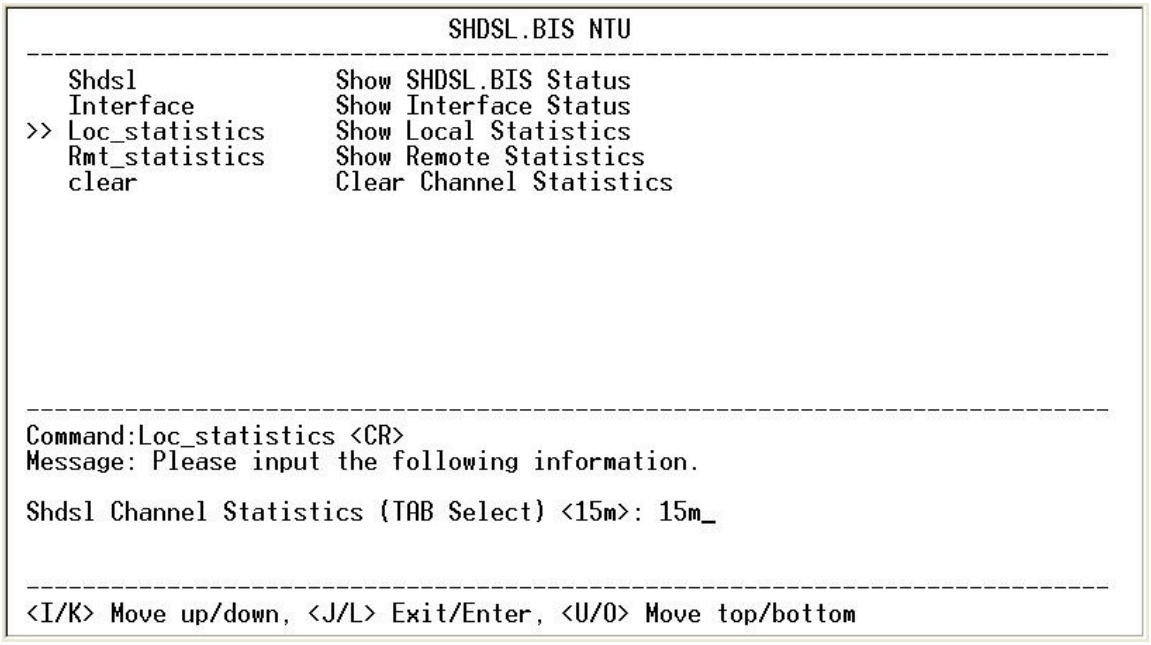
```
                                SHDSL.BIS NTU
------------------------------------------------------------------------------
>> Shdsl                Show SHDSL.BIS Status
   Interface            Show Interface Status
   Loc_statistics       Show Local Statistics
   Rmt_statistics       Show Remote Statistics
   clear                Clear Channel Statistics









------------------------------------------------------------------------------
Command:Shdsl <CR>
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```


SHDSL.BIS NTU
<Shdsl Status>
Channel : LocA RmtA
STU Type : STU-R
DSL Type : SHDSL.BIS
Line Rate(Kpbs) : 0
Line Rate(Kpbs) : 0
SNR Margin (dB) : 0.0
Attenuation(dB) : 0.0
Led On/Off Status : 0037
Led Flash Status : 0000
Loopback State : Disable
Bert Test State : Disable
Bert Sync : Not Sync
Bert Error Count : 0
Refresh counter:2, Press 'Ctrl+C' to quit...
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The SHDSL status will display a real-time status of the DSL on local side and remote side if connected. The screen is refreshed about every 1.5 seconds. The monitoring window displays the DSL line parameters, such as SNR margin and attenuation. The lower half of the window displays the loopback and BER test status. While in this display mode the terminal window will not timeout. To exit the window, press CTRL-C to quit.

4.7 View the Statistic

Select **Loc_statistic** command to show the statistic information in 15 minutes or 24 hour via [TAB] to choose.


SHDSL.BIS NTU
Shdsl Show SHDSL.BIS Status
Interface Show Interface Status
>> Loc_statistics Show Local Statistics
Rmt_statistics Show Remote Statistics
clear Clear Channel Statistics
Command:Loc_statistics <CR>
Message: Please input the following information.
Shdsl Channel Statistics (TAB Select) <15m>: 15m_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The statistics display window will display performance monitor data for the selected interval (15 minutes or 24 hours). The display will show the recorded results for ES (error seconds), SES (severely errored seconds), UAS (unavailable seconds), and LOSW (loss of sync word). While in this display mode the terminal window will not timeout. The 15 minute display window will display all the performance information for each 15 minute interval in the current 24 hour period. There are a total of 96 intervals. Press the ENTER key to display the next page of intervals. To exit the window, press CTRL-C and then ENTER.

The performance monitor is capable of storing and retrieving performance information for each 24 hours interval, up to 7 days.

For E1 Interface model, there have SHDSL and E1 item.

View the performance monitor data for the selected interval 15 minutes:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Local                          SHDSL                    E1
                    ------------------------    ------------------
15 Minute           ES     SES     UAS    LOSW     ES     SES     UAS
Current              0       0       0       0       0       0       2
Quarter  1           0       0       0       0       0       0       0
Quarter  2           0       0       0       0       0       0       0
Quarter  3           0       0       0       0       0       0       0
Quarter  4           0       0       0       0       0       0       0
Quarter  5           0       0       0       0       0       0       0
Quarter  6           0       0       0       0       0       0       0
Quarter  7           0       0       0       0       0       0       0
Quarter  8           0       0       0       0       0       0       0
Quarter  9           0       0       0       0       0       0       0
Quarter 10           0       0       0       0       0       0       0
Quarter 11           0       0       0       0       0       0       0
Quarter 12           0       0       0       0       0       0       0
Quarter 13           0       0       0       0       0       0       0
Quarter 14           0       0       0       0       0       0       0
More .... <CR>
_
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

View the performance monitor data for the selected interval 7days:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Local                          SHDSL                    E1
                    ------------------------    ------------------
24 Hour             ES     SES     UAS    LOSW     ES     SES     UAS
Current              0       0       0       0       0       0      53
Day  1               0       0       0       0       0       0       0
Day  2               0       0       0       0       0       0       0
Day  3               0       0       0       0       0       0       0
Day  4               0       0       0       0       0       0       0
Day  5               0       0       0       0       0       0       0
Day  6               0       0       0       0       0       0       0
Day  7               0       0       0       0       0       0       0









Press any key to Return Menu Window..._
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For Serial and Ethernet Interface model, there have only SHDSL item.

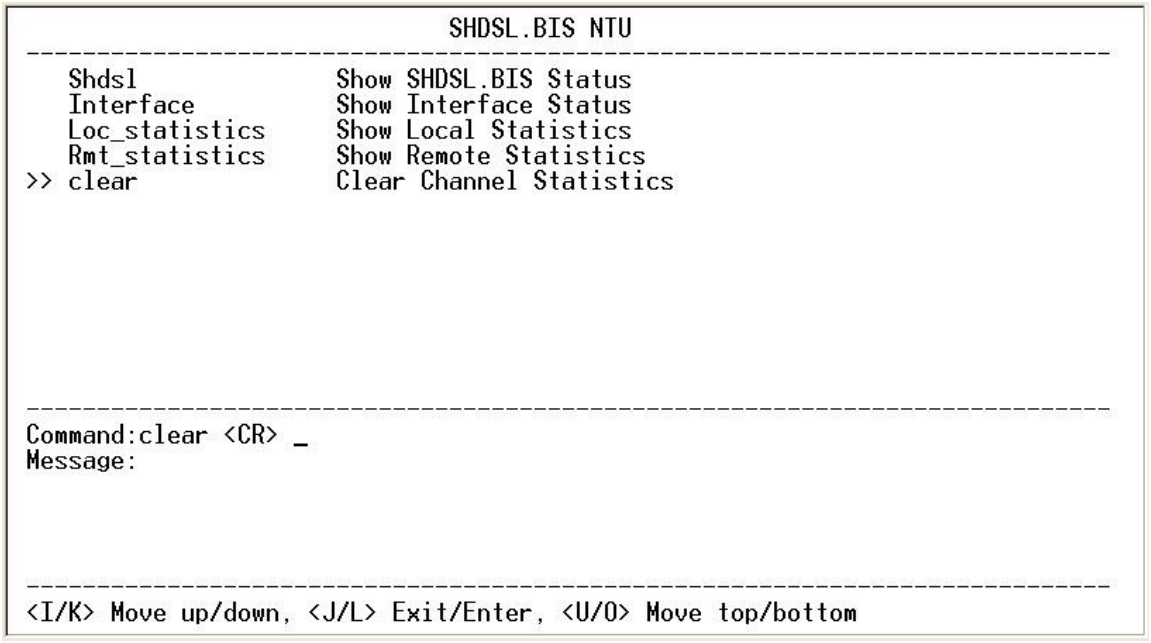
View the performance monitor data for the selected interval 15 minutes:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Local                          SHDSL
                     -------------------------
15 Minute             ES     SES     UAS    LOSW
Current               0       0       0       0
Quarter  1            0       0       0       0
Quarter  2            0       0       0       0
Quarter  3            0       0       0       0
Quarter  4            0       0       0       0
Quarter  5            0       0       0       0
Quarter  6            0       0       0       0
Quarter  7            0       0       0       0
Quarter  8            0       0       0       0
Quarter  9            0       0       0       0
Quarter 10            0       0       0       0
Quarter 11            0       0       0       0
Quarter 12            0       0       0       0
Quarter 13            0       0       0       0
Quarter 14            0       0       0       0
More .... <CR>
-
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

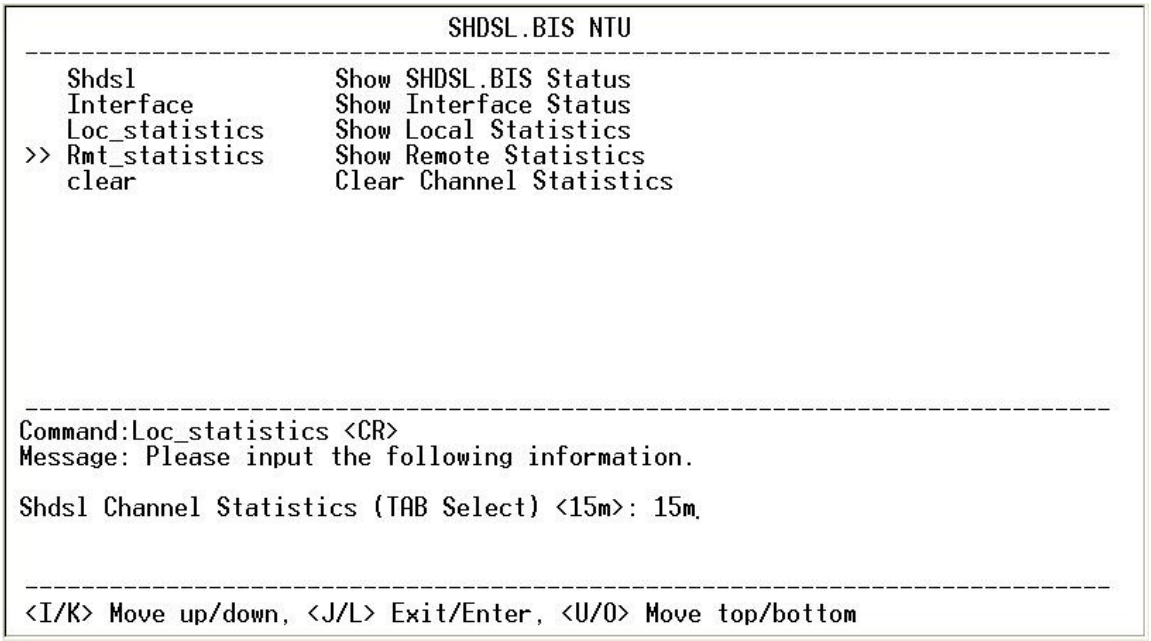
View the performance monitor data for the selected interval 7 days:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Local                          SHDSL
                     -------------------------
24 Hour               ES     SES     UAS    LOSW
Current               0       0       0       0
Day  1                0       0       0       0
Day  2                0       0       0       0
Day  3                0       0       0       0
Day  4                0       0       0       0
Day  5                0       0       0       0
Day  6                0       0       0       0
Day  7                0       0       0       0









Press any key to Return Menu Window..._
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

To clear the statistic log file, select **clear** and press [ENTER].



If you want to show the remote side's statistics, please use the Rmt-statistics function as the following.

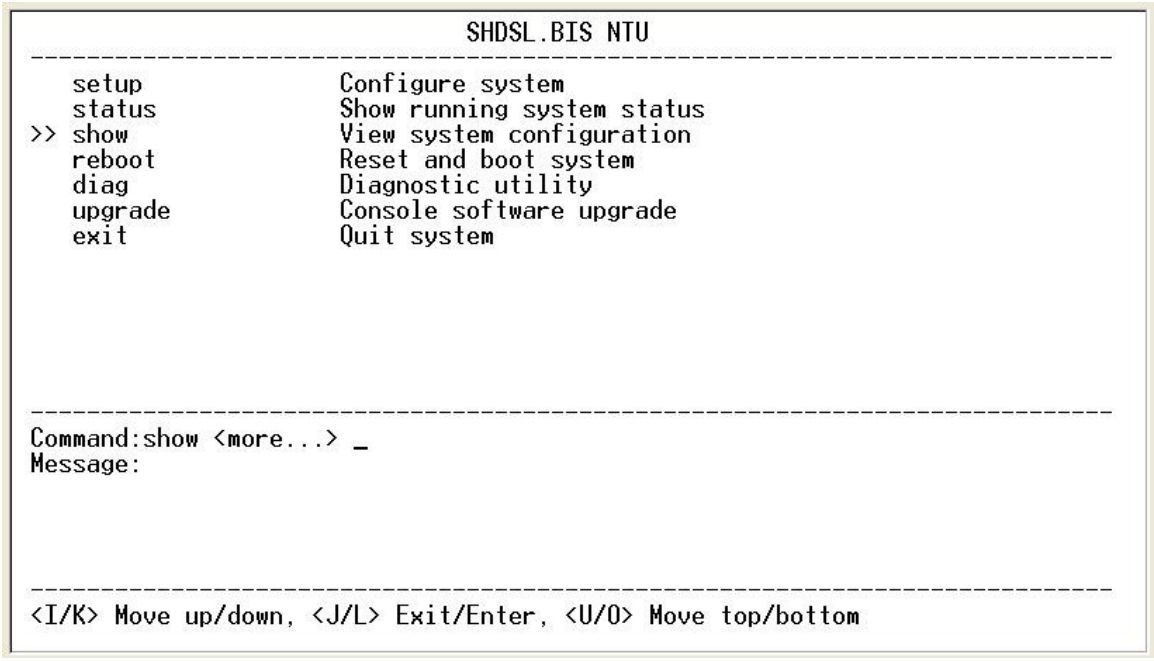

SHDSL.BIS NTU
Shdsl Show SHDSL.BIS Status
Interface Show Interface Status
Loc_statistics Show Local Statistics
>> Rmt_statistics Show Remote Statistics
clear Clear Channel Statistics
Command:Loc_statistics <CR>
Message: Please input the following information.
Shdsl Channel Statistics (TAB Select) <15m>: 15m
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The following are commonly used acronyms:

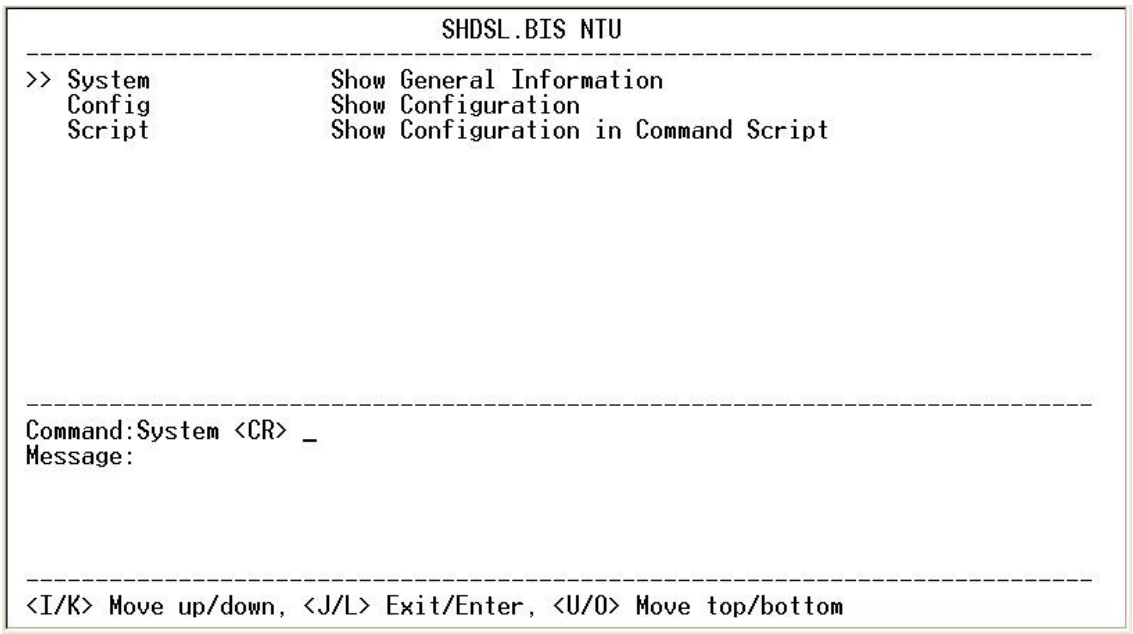
ES	Number of errored seconds in which one or more CRC (Cyclic Redundancy Check) error events occurred during the current interval. This value is updated every time.
UAS	Number of unavailable seconds in which a failed signal occurred during the current interval. This value is updated every time.
SES	Number of severely errored seconds in which 832 or more CRC error events occurred during the current interval. This value is updated every time.
LOSW	Number of seconds with loss of sync word during the current interval. This value is updated every time.

4.8 View System Configuration

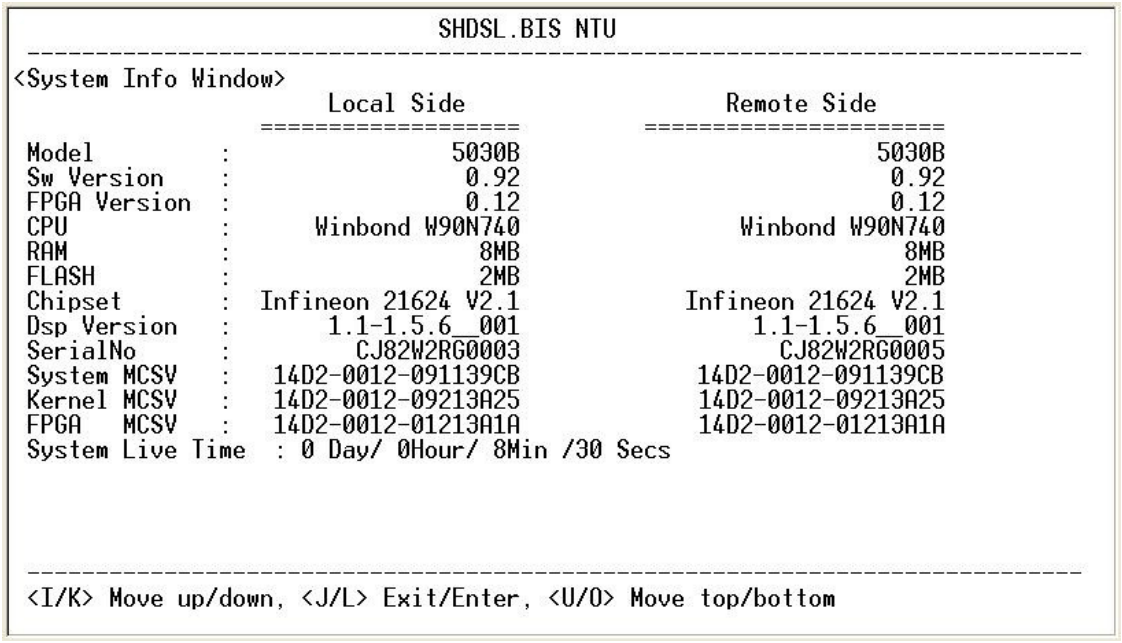
By using show command, you can view the system configuring. Select **show** and press [ENTER] or [RIGHT].



To show system information, please select **system** and press [ENTER] or [RIGHT]. The screen will prompt the system information.



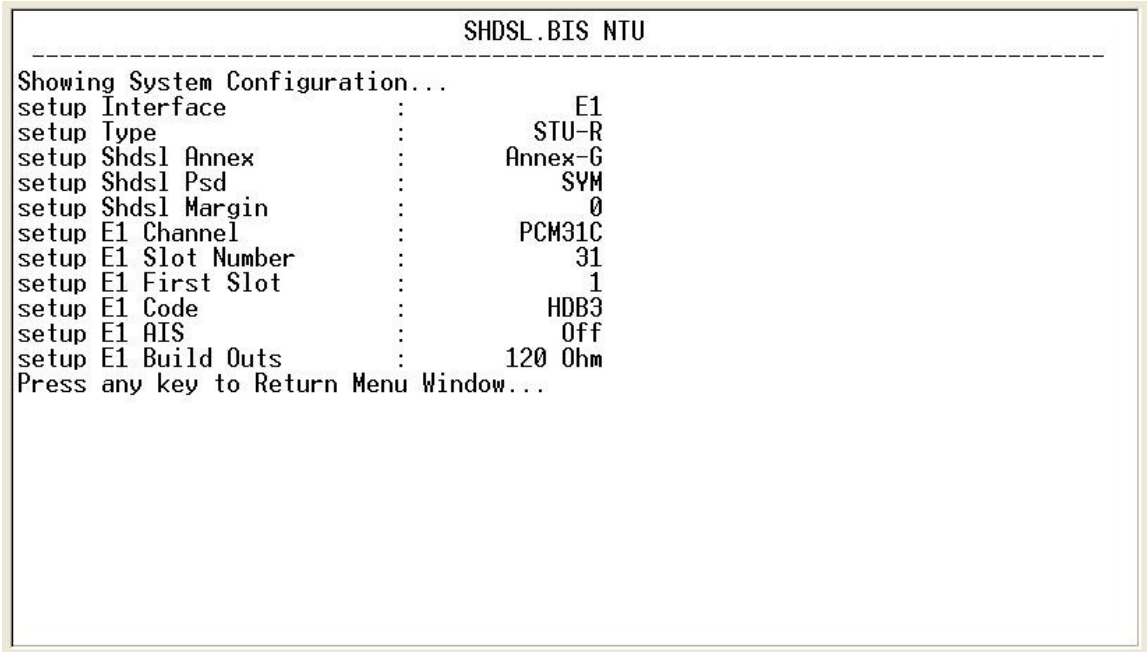
Our cursor is already on the **System** command, so press ENTER and the following screen will display the general system information.


SHDSL.BIS NTU
<System Info Window>
Local Side
Remote Side
Model : 5030B 5030B
Sw Version : 0.92 0.92
FPGA Version : 0.12 0.12
CPU : Winbond W90N740 Winbond W90N740
RAM : 8MB 8MB
FLASH : 2MB 2MB
Chipset : Infineon 21624 V2.1 Infineon 21624 V2.1
Dsp Version : 1.1-1.5.6__001 1.1-1.5.6__001
SerialNo : CJ82W2RG0003 CJ82W2RG0005
System MCSV : 14D2-0012-091139CB 14D2-0012-091139CB
Kernel MCSV : 14D2-0012-09213A25 14D2-0012-09213A25
FPGA MCSV : 14D2-0012-01213A1A 14D2-0012-01213A1A
System Live Time : 0 Day/ 0Hour/ 8Min /30 Secs
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

Most of the information on this screen is either self explanatory or it is simply irrelevant for the end user. However, two items, the Kernel (SW Version)and FPGA (Field Programmable Gate Array) version will give the software and hardware versions respectively of NTU. These are important to know in case new firmware becomes available in the future to add extra functions of to fix unknown bugs from the original manufactured equipment.

To show the system configuration, please select **Config** and press [ENTER] or [RIGHT]. The screen will prompt the all configuration data.

For E1 interface mode:


SHDSL.BIS NTU
Showing System Configuration...
setup Interface : E1
setup Type : STU-R
setup Shdsl Annex : Annex-G
setup Shdsl Psd : SYM
setup Shdsl Margin : 0
setup E1 Channel : PCM31C
setup E1 Slot Number : 31
setup E1 First Slot : 1
setup E1 Code : HDB3
setup E1 AIS : Off
setup E1 Build Outs : 120 Ohm
Press any key to Return Menu Window...

For Serial interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup Interface             :        Serial
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-G
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :             0
setup Serial Interface      :           V35
setup Serial Data Rate      :            32
setup Serial Clock          :        normal
setup Serial Rts            :            on
setup Serial Cts            :      from_rts
setup Serial Dsr            :            on
setup Serial Dcd            :      from_dsl
setup Serial Delay          :             3
Press any key to Return Menu Window...
```

For Ethernet interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup Interface             :      Ethernet
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-G
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :             0
setup Ethernet Auto Config  :        Enable
setup Ethernet Speed        :          100M
setup Ethernet Duplex       :   Full-Duplex
setup Ethernet Rate         :            36
Press any key to Return Menu Window...
```

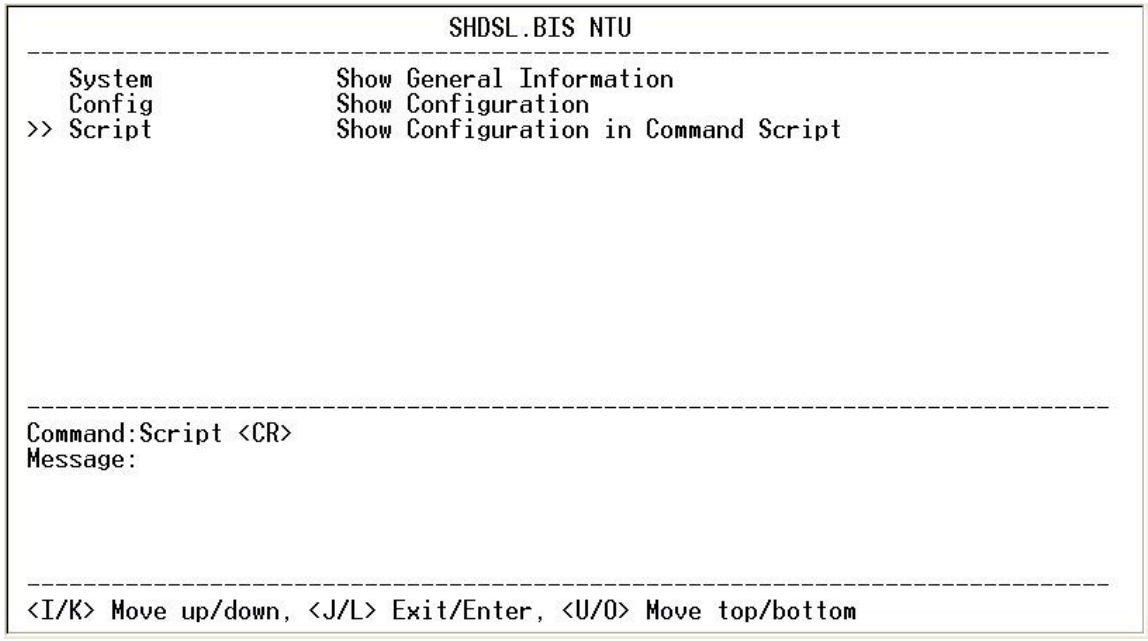
For E1 and Serial interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup Interface             :     E1+Serial
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-G
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :             0
setup E1 Channel            :        PCM31C
setup E1 Slot Number        :            31
setup E1 First Slot         :             1
setup E1 Code               :          HDB3
setup E1 AIS                :           Off
setup E1 Build Outs         :       120 Ohm
setup Serial Interface      :           V35
setup Serial Data Rate      :            32
setup Serial Clock          :        normal
setup Serial Rts            :            on
setup Serial Cts            :      from_rts
setup Serial Dsr            :            on
setup Serial Dcd            :      from_dsl
setup Serial Delay          :             3
Press any key to Return Menu Window...
```

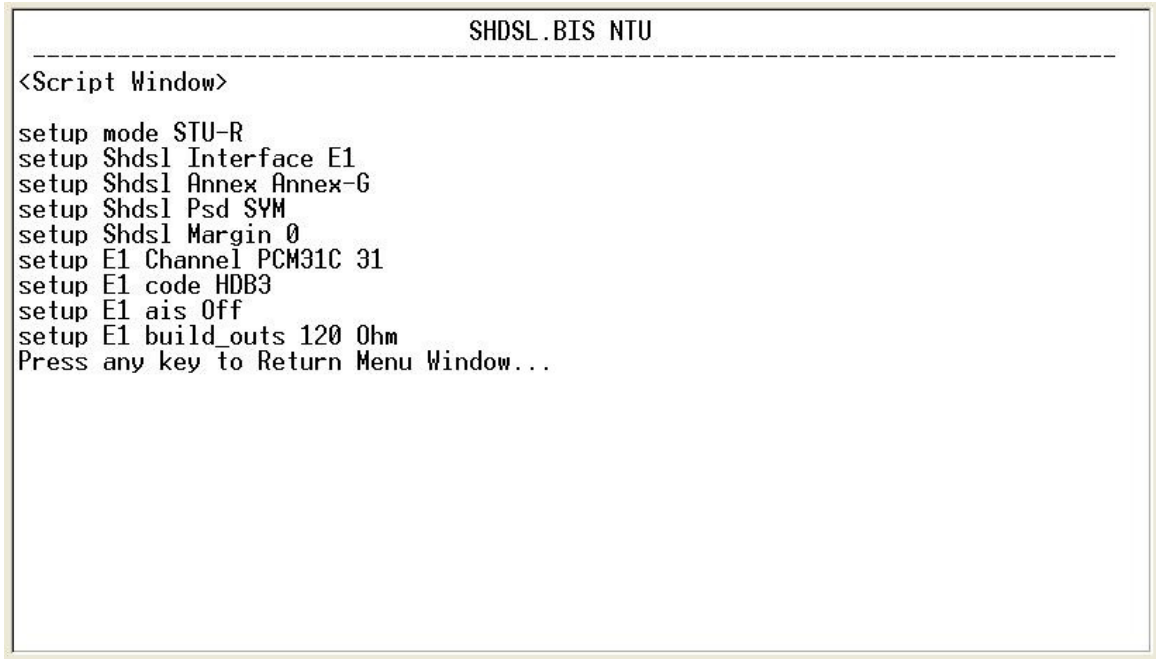
For E1 and Ethernet interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup Interface             :   E1+Ethernet
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-G
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :             0
setup E1 Channel            :        PCM31C
setup E1 Slot Number        :            31
setup E1 First Slot         :             1
setup E1 Code               :          HDB3
setup E1 AIS                :           Off
setup E1 Build Outs         :       120 Ohm
setup Ethernet Auto Config  :        Enable
setup Ethernet Speed        :          100M
setup Ethernet Duplex       :   Full-Duplex
setup Ethernet Rate         :            36
Press any key to Return Menu Window...
```

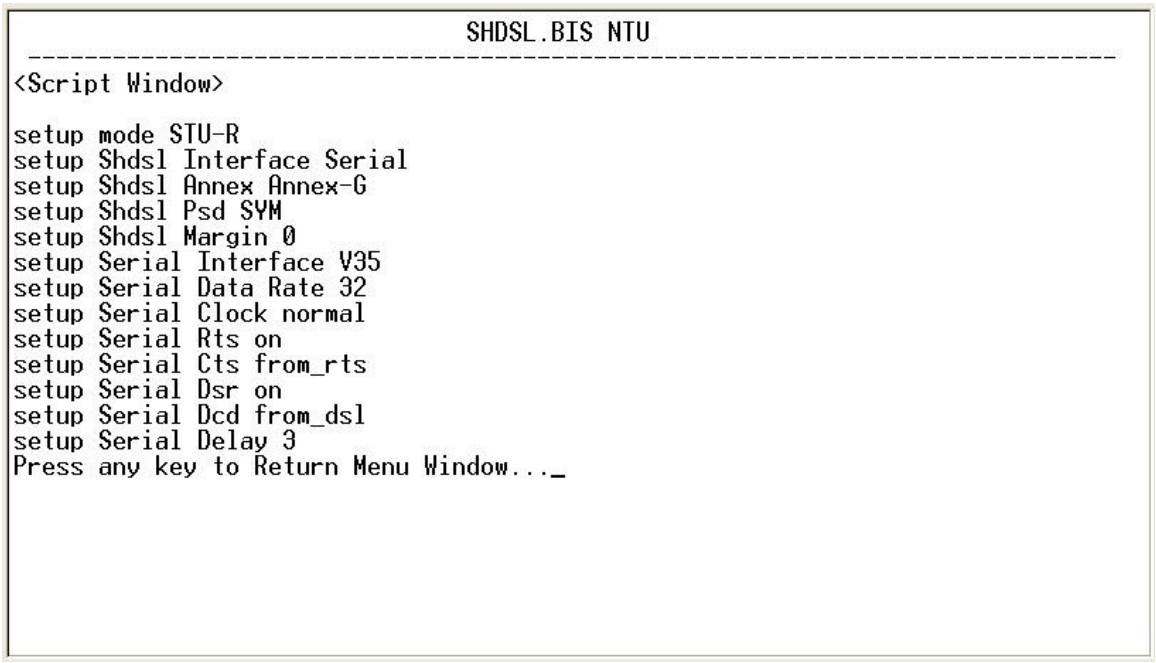
To show the system script file, please select **Script** and press [ENTER] or [RIGHT]. The screen will prompt the configuration in script type.



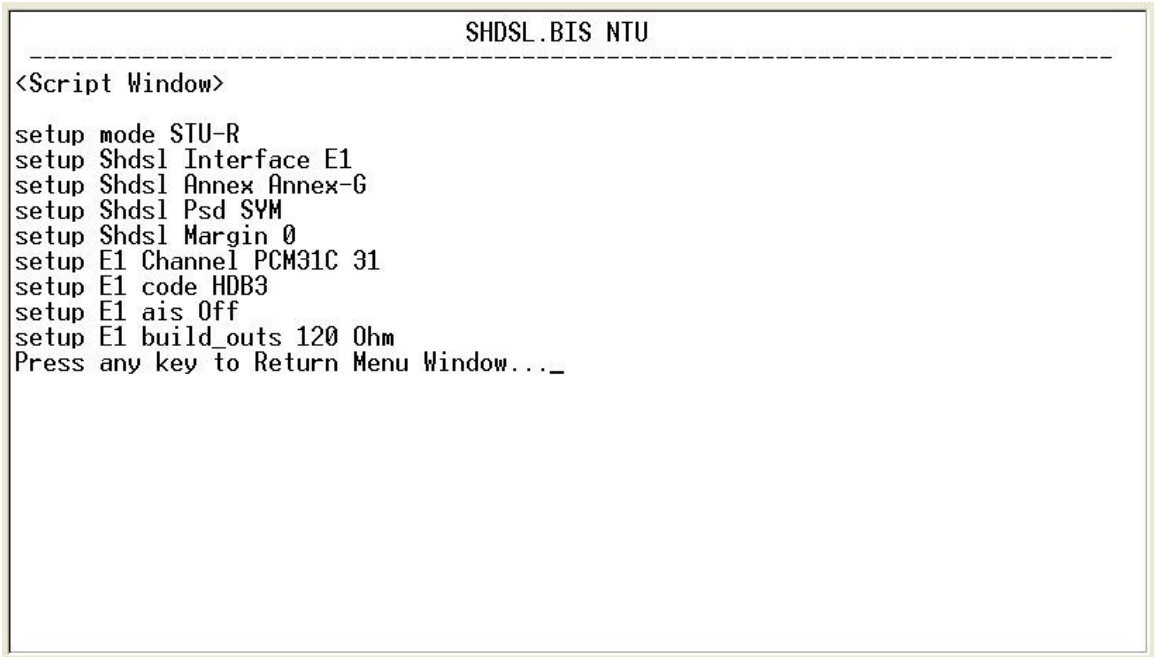
For E1 interface mode:


SHDSL.BIS NTU
<Script Window>
setup mode STU-R
setup Shdsl Interface E1
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup E1 Channel PCM31C 31
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
Press any key to Return Menu Window...

For Serial interface mode:


SHDSL.BIS NTU
<Script Window>
setup mode STU-R
setup Shdsl Interface Serial
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window..._

For Ethernet interface mode:


SHDSL.BIS NTU
<Script Window>
setup mode STU-R
setup Shdsl Interface E1
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup E1 Channel PCM31C 31
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
Press any key to Return Menu Window..._

For E1 and Serial interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface E1+Serial
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup E1 Channel PCM31C 31
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window..._
```

For E1 and Ethernet interface mode:

```
                                SHDSL.BIS NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface E1+Ethernet
setup Shdsl Annex Annex-G
setup Shdsl Psd SYM
setup Shdsl Margin 0
setup E1 Channel PCM31C 31
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
setup Ethernet Rate 36
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M
Press any key to Return Menu Window..._
```

4.9 Upgrade

This section will introduce how to upgrade the kernel and FPGA code of G.SHDSL .Bis NTU.

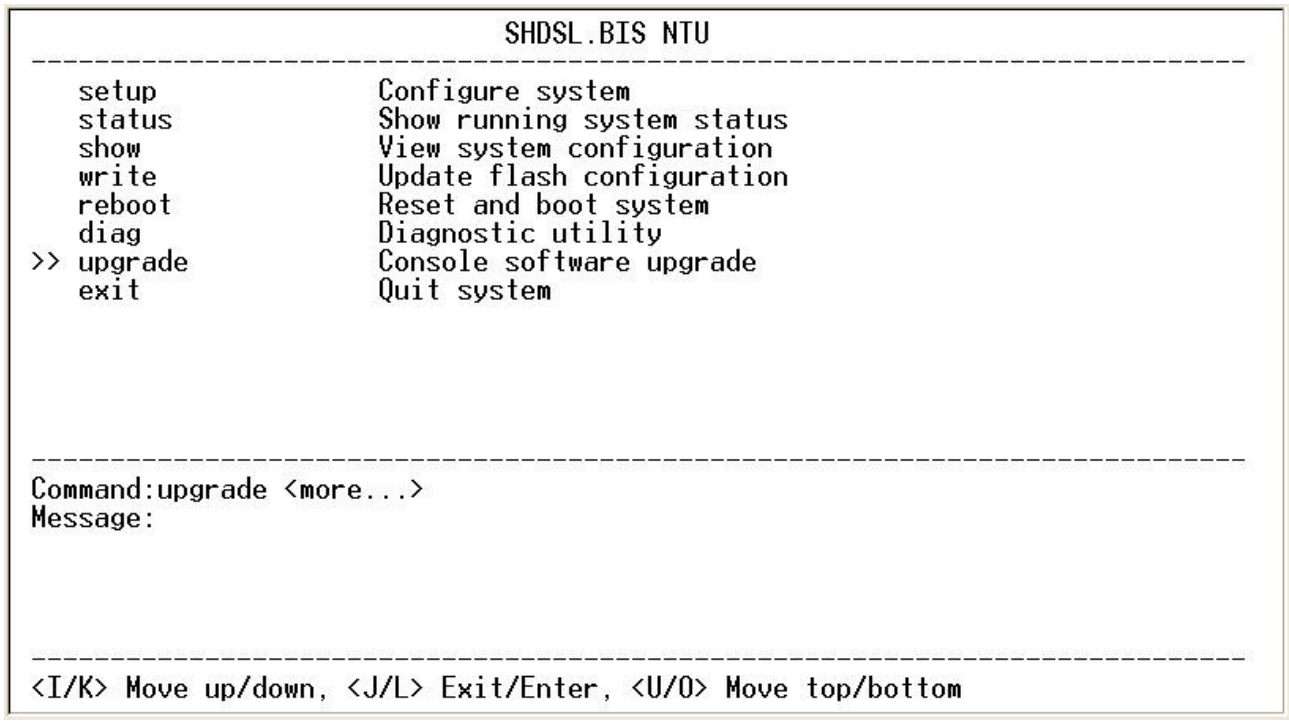
Select **upgrade** in main menu and press [ENTER] or [RIGHT].

Please notice that when you use Remote Upgrade feature. It means you can use those feature to update firmware to remote side. It will describe below.

During on upgrade and re-flash, the normal transmissions will be halted, so the upgrade should be done when the system is taken offline or done during a time of extremely low impact to the customer's line.

The upgrade process use the Xmodem protocol via the rear panel's serial console port.

Following show the upgrade feature :



Before upgrading the NTU, you must have the main software or FPGA code in your computer.

If you want to upgrade the kernel:

Select **Kernel** and press [ENTER] or [RIGHT].

```
                                SHDSL.BIS NTU
--------------------------------------------------------------------------------
>> Kernel              Upgrade main software
   Fpga                Upgrade FPGA code
   Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Kernel <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Click Send file in terminal access program, hyper terminal, to send the file. Make sure the sending protocol is **Xmodem**. Select the source file in window and press OK.

Once the upgrade is complete, there required to male the final confirmation to erase and re-write the flash with new code.

When it was upgrading, you can see as following:

```
                                SHDSL.BIS NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCCCCCCCCCCCCCC_

                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If you want to upgrade the FPGA code: Select **FPGA** and press [ENTER] or [RIGHT].

```
                                SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
>> Fpga                 Upgrade FPGA code
   Rmt Kernel           Upgrade the remote's main software
   Rmt FPGA             Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Fpga <CR> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When it was upgrading, you can see as following:

```
                                SHDSL.BIS NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCC_

--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

This is the remote upgrade feature:

```
                              SHDSL.BIS NTU
--------------------------------------------------------------------------------
   Kernel              Upgrade main software
   Fpga                Upgrade FPGA code
>> Rmt Kernel         Upgrade the remote's main software
   Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Rmt Kernel <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

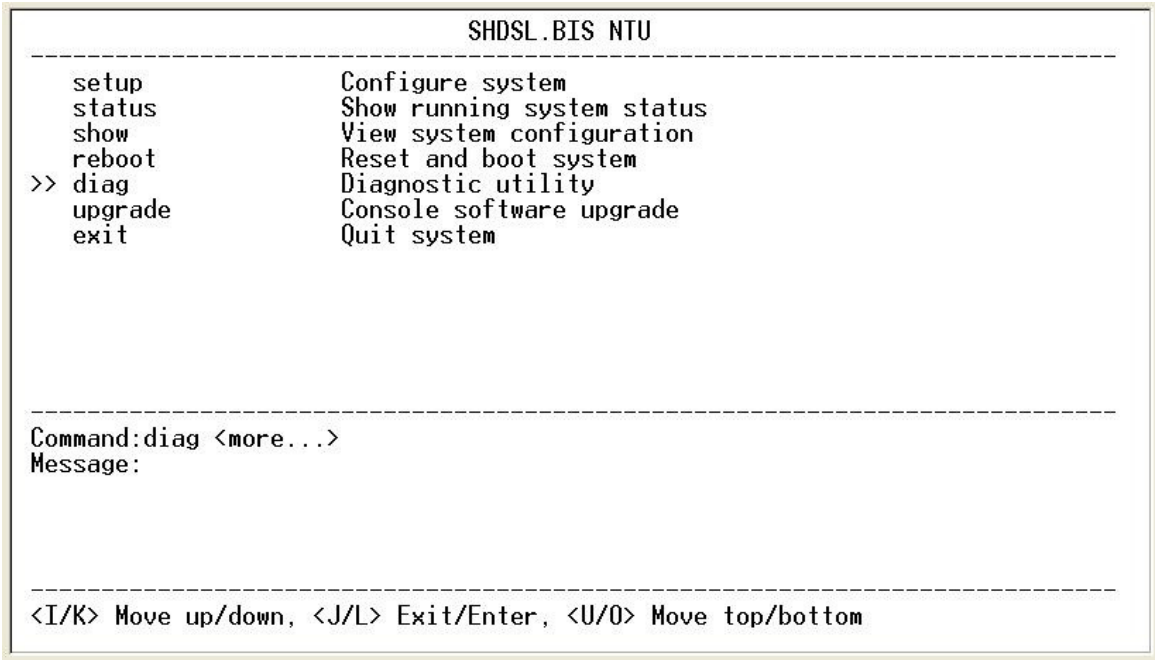
```
                              SHDSL.BIS NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCC_

                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
                                                                    
--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Before upgrading the NTU, you must have the Kernel code and FPGA code in your computer.

WARNING!!: Do not allow any interruption of power during the erase and re-write operation or the Flash will be left in an unknown state and the device will no longer be able to function. The device must then be returned to the factory for repair.

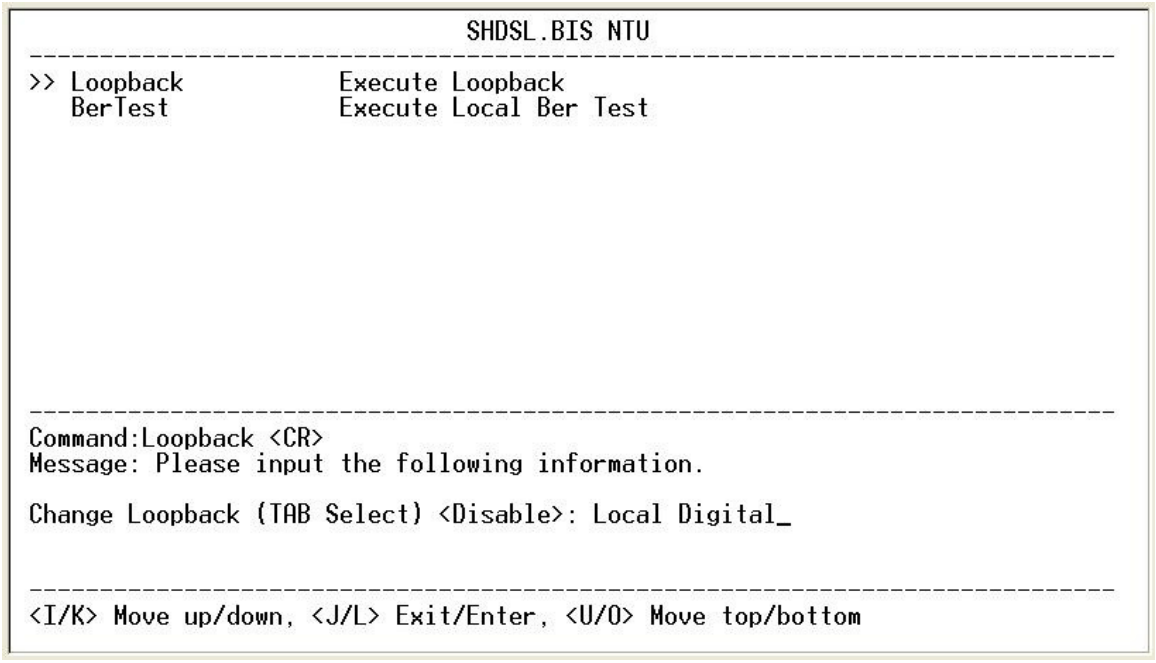
4.10 Diagnostic

The diagnostic facility allows you to test the different aspects of your G.SHDSL .Bis NTU to determine if it is working properly. Select **diag** and press [ENTER] or [RIGHT].



Loopback can test whether the NTU is properly worked with the connection device.

Press [ENTER] or [RIGNT] to setup the loopback.


SHDSL.BIS NTU
>> Loopback Execute Loopback
BerTest Execute Local Ber Test
Command:Loopback <CR>
Message: Please input the following information.
Change Loopback (TAB Select) <Disable>: Local Digital_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

For E1 Interface model as CO side, there have: Local Digital, local, remote line, remote payload, farend line and farend payload.

For Serial Interface model as CO side, there have: Local Digital, local, remote line, remote payload, farend line, farend payload and V.54.

For E1 Interface model as CPE side, there have: Local Digital, remote line, remote payload, farend line and farend payload.

For Serial Interface model as CPE side, there have: Local Digital, remote line, remote payload, farend line, farend payload and V.54.

If the device haven't connect or under handshake, there will not have farend line, farend payload and V.54.There are no diagnostic function on Ethernet interface model.

Stand alone NTU, no connection with other NTU:

E1 interface CO side	Serial interface CO side
Local Digital	Local Digital
Local	Local
Remote line	Remote line
Remote payload	Remote payload

E1 interface CPE side	Serial interface CPE side
Local Digital	Local Digital
Remote line	Remote line
Remote payload	Remote payload

After connection both CO side and CPE side:

E1 interface CO side	Serial interface CO side
Local Digital	Local Digital
Local	Local
Remote line	Remote line
Remote payload	Remote payload
Farend line	Farend line
Farend payload	Farend payload
	V.54

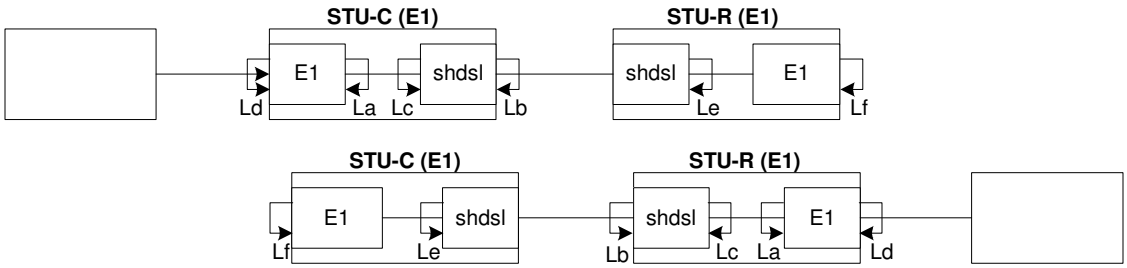
E1 interface CPE side	Serial interface CPE side
Local Digital	Local Digital
Remote line	Remote line
Remote payload	Remote payload
Farend line	Farend line
Farend payload	Farend payload
	V.54

*Definition of **V.54***

An ITU standard (1976) for various loopback tests that can be incorporated into modems for testing the telephone circuit and isolating transmission problems.

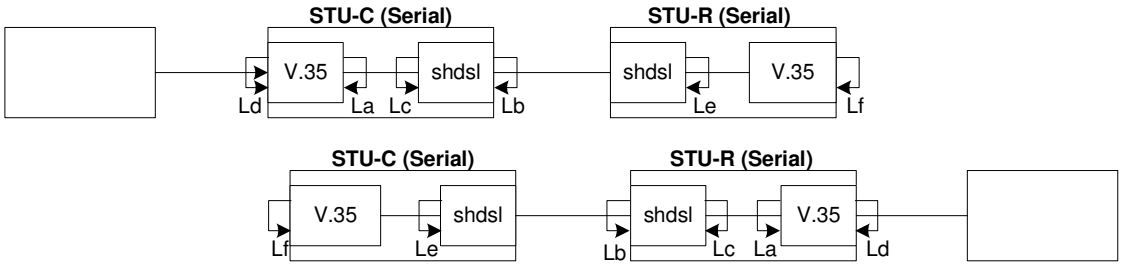
Operating modes include local and remote digital loopback and local and remote analog loopback.

Loopback Define E1 vs E1



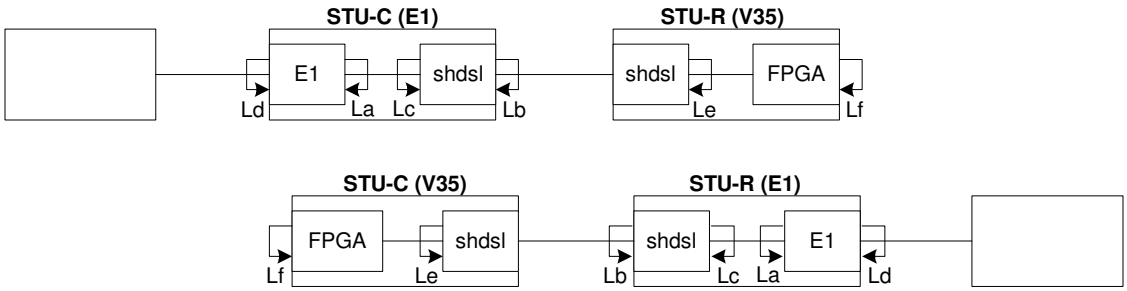
Local Digital	La
Local	Lb
Remote Line	Lc
Remote Payload	Ld
Far End Line	Le
Far End Payload	Lf

Loopback Define Serial vs Serial



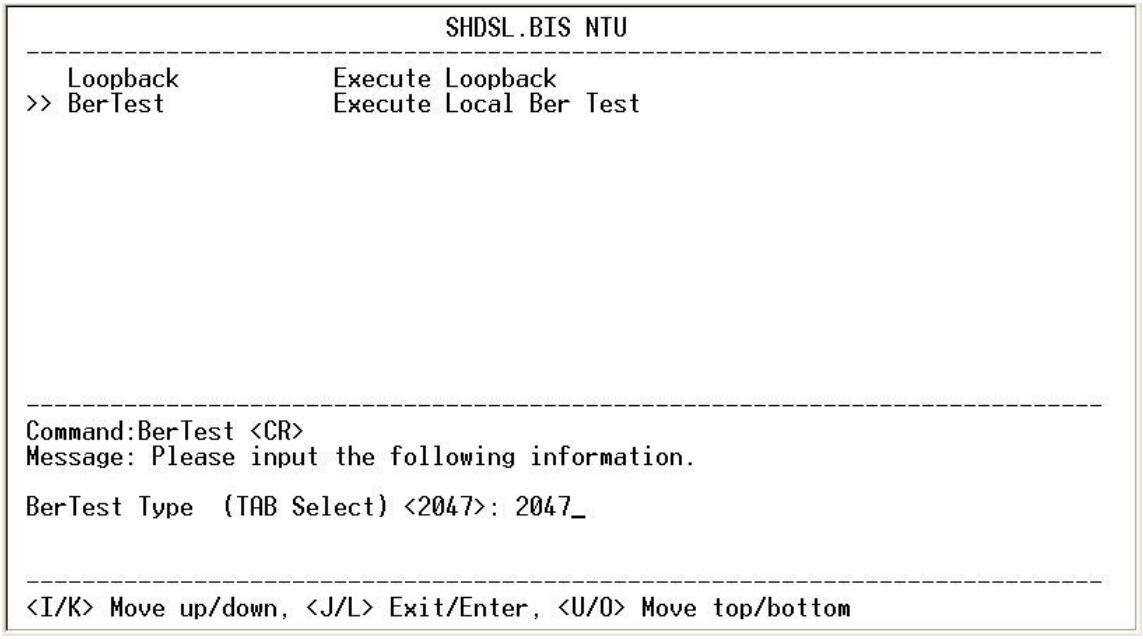
Local Digital	La
Local	Lb
Remote Line	Lc
Remote Payload	Ld
Far End Line	Le
Far End Payload	Lf
V.54	

Loopback Define Fractional E1 vs V35

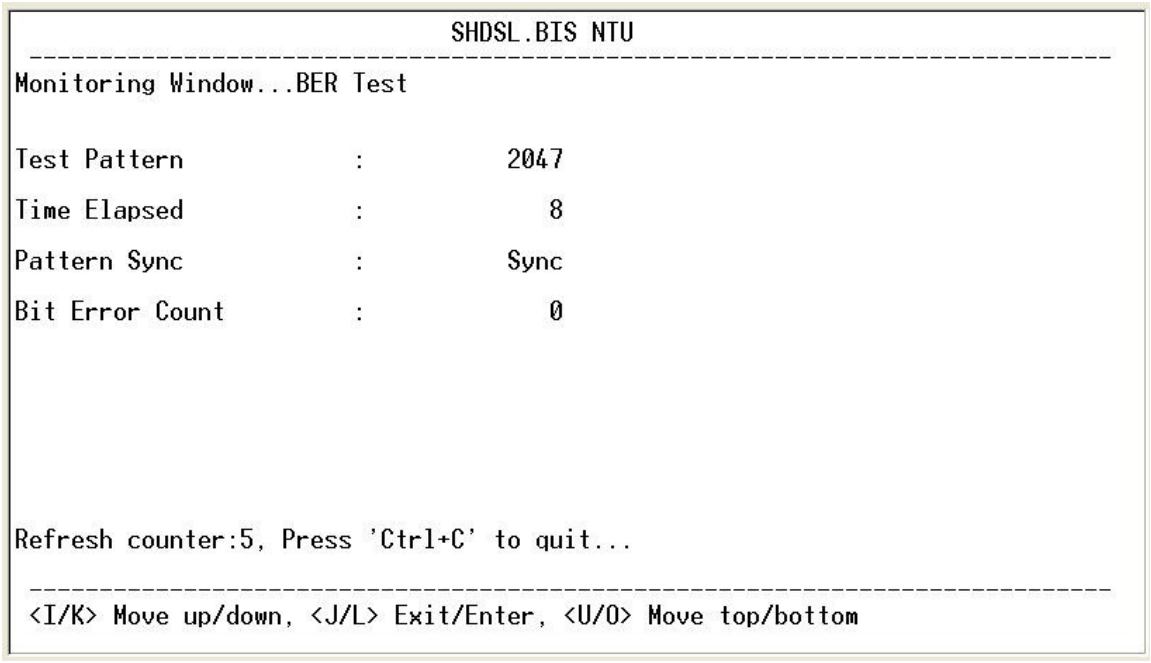


Local Digital	La
Local	Lb
Remote Line	Lc
Remote Payload	Ld
Far End Line	Le
Far End Payload	Lf

The product supports Bit Error Rate Testing (BERT). To configure the BERT, move the cursor to **BerTest** and press [ENTER] or [RIGHT].


SHDSL.BIS NTU
Loopback Execute Loopback
>> BerTest Execute Local Ber Test
Command:BerTest <CR>
Message: Please input the following information.
BerTest Type (TAB Select) <2047>: 2047_
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

The BER Test screen is as following:


SHDSL.BIS NTU
Monitoring Window...BER Test
Test Pattern : 2047
Time Elapsed : 8
Pattern Sync : Sync
Bit Error Count : 0
Refresh counter:5, Press 'Ctrl+C' to quit...
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

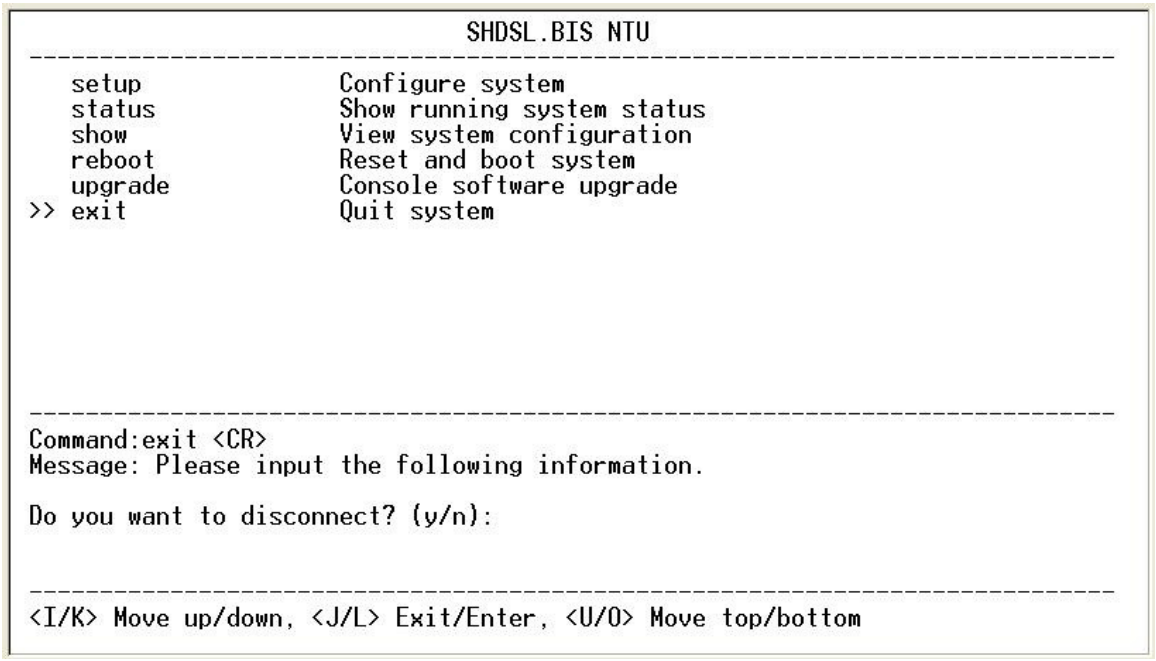
The G.SHDSL Bis NTU includes an internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any need for an external test equipment. This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern.

Test Pattern: 2047	Use the standard 2047 (2^{11}-1) test pattern
Time Elapsed	Show the time elapsed count
Pattern Framing	Show the linking is sync or no sync
Bit Error Count	Show the bit error counter
Refresh counter	Page refresh counter

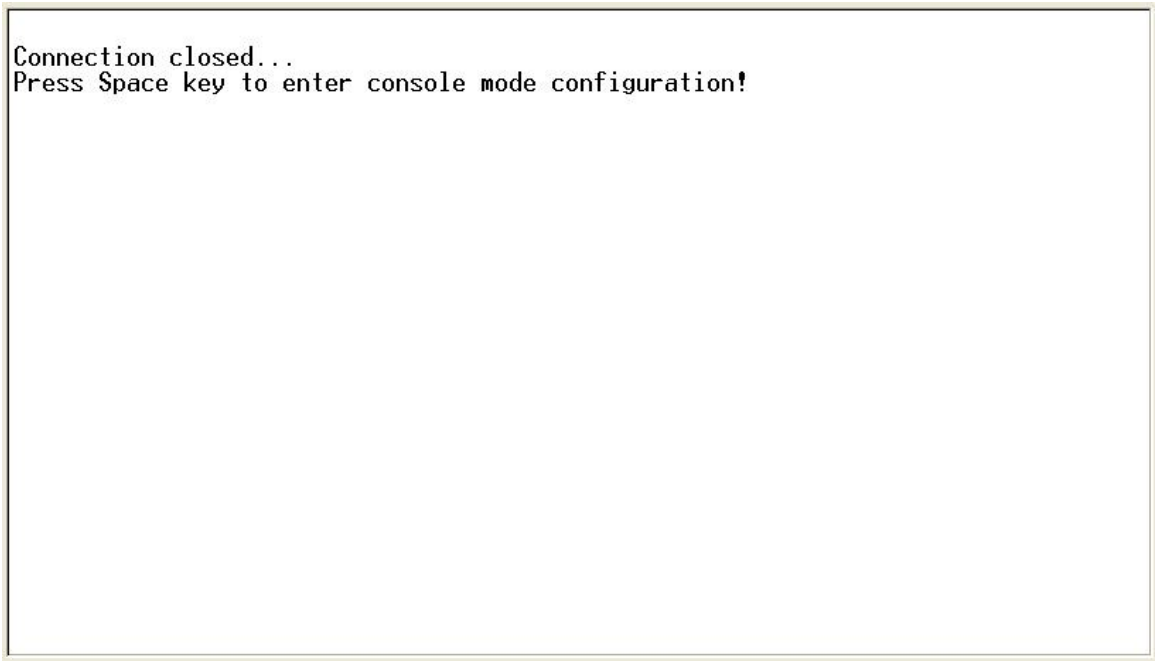
You can press CTRL-C to quit this page anytime.

4.11 Exit

For exiting the system without saving any configuration, you can use **exit** command to exit. Select **exit** and press [ENTER] or [RIGHT]. Answer y(es) to confirm.


SHDSL.BIS NTU
setup Configure system
status Show running system status
show View system configuration
reboot Reset and boot system
upgrade Console software upgrade
>> exit Quit system
Command:exit <CR>
Message: Please input the following information.
Do you want to disconnect? (y/n):
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom

After press [ENTER], the system will be disconnected.



When the system have disconnected, we can see the close screen. You can press Space key to restart.

The new login screen will show again, you can type username and password again to enter.

5. Appendix

5.1 Abbreviation

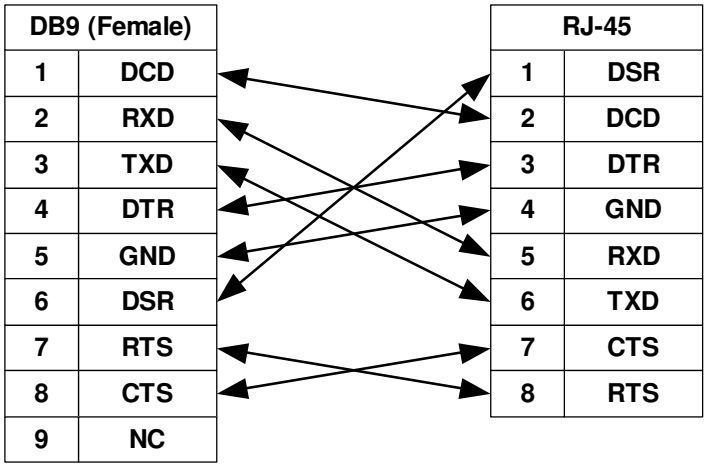
AIS	Alarm Indication Signal
AMI	Alternate mark inversion
ASYM	Asymmetric
ATM	Asynchronous Transfer Mode
B8ZS	Bipolar with 8 zero substitution
BER	Bit error rate
BERT	Bit Error Rate Tester
BNC	Bayonet Nut Coupling Bayonet Neill-Concelman Barrel Nut Connector, Bayonet Nipple Connector Bayonet Navy Connector Baby N Connector
CAS	Channel Associated Signaling
CERR	CRC Errors
CO	Central Office
CPE	Customer Premises Equipment
CRC CRC4	Cyclic redundancy check Cyclic redundancy check 4 bit
CRS	Carrier Sense
CTS	Clear to send
DCD	Data carrier detect
DCE	Data communication equipment
DSL	Digital subscriber loop
DSR	Data set ready
DSLAM	DSL Access Multiplexer
DTE	Data terminal equipment
DTR	Data terminal ready
E BIT GEN EOC	Remote End Block Error Bit generation Embedded operations channel
ES	Number of Error second (Errors/Second)
ESF	Extended super frame

ETSI	European Telecommunications Standardization Institute
FAS	Frame alignment signal
FCS	Frame Check Sequence
HDB3	High-Density Bipolar of order 3
HEC	Header error check
I/F	Interface
ITU	International Telecommunication Union
ITU-T	ITU-Telecommunication Standardization Sector
LBO	Line Build Out
LIU	Line Interface Unit
LOC	Loss of Connection
LOF	Loss of frame
LOS	Loss of signal
LOSW	Loss of synchronization word
MAS	Multi-frame Alignment Sequence (CAS Format)
MFAS	Multi-frame Alignment Sequence (CRC4 Format)
NI	Network Interface
NRZ	Non-Return to Zero
PABX	Private Automatic Branch Exchange
PAM	Pulse Amplitude Modulation
POTS	Plain Old Telephone Service
PRBS	Pseudo-Random Bit Sequence
PSD	Power spectral density
QRSS	Quasi-Random Signal Source
RAI	Remote alarm indication
RESYNC	Resynchronization
RJ-45	Registered Jack-45
RTS	Request to send
RX	Receiver
SES	Number of Severely error seconds (more than 832 CRC errors / second. Approximately equivalent to a bit error rate of 1 x 10^{-3}.
SF	Super Frame
SHDSL	Symmetric High-Bitrate Digital Subscriber Loop
SLC	Subscriber Loop Carrier
SMF	Sub-Multi frame
SNR MARGIN	Signal to noise ration margin
STU	SHDSL Terminal Unit

STU-C	SHDSL Terminal Unit CO side
STU-R	SHDSL Terminal Unit RT side
STU-C-INTCLK	STU-C internal clock
STU-R-EXTCLK	STU-R external clock
SYM	Symmetric
SYNC	Synchronization
TC-PAM	Trellis Coded Pulse Amplitude Modulation
TDM	Time Division Multiplexing
TPS-TC	Transmission Protocol Specific TC layer
TX	Transmitter
TX POWER	Transmission power
UAS	Unavailable second
UI	User interface
xDSL	“Any” DSL , (ADSL , HDSL ,SHDSL or VDSL etc)

5.2 Console Cable

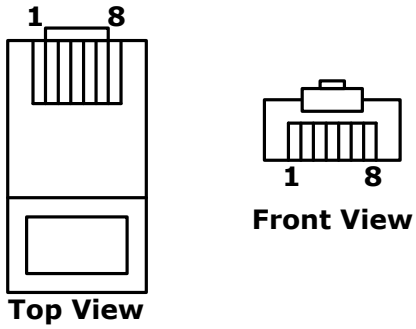
DB9 vs. RJ45 Cable wire connection



The table below displays Serial Interface Pin Assignments for the DCE Mode.

Console Connector (RJ-45)

The Console Port interface is a 8 position Modular Jack. The table below displays the pin out assignments.

Pin Number	Description	Figure
1	No connection	
2	No connection	
3	No connection	
4	GND	
5	RD	
6	TD	
7	No connection	
8	No connection	

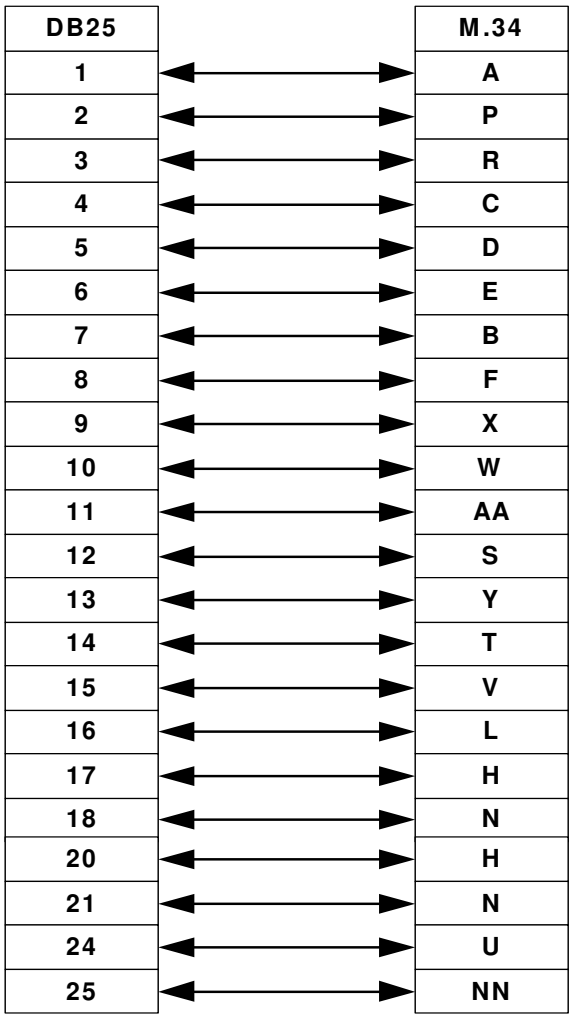
5.3 Serial Interface Pin Assignments

The table below displays Serial Interface Pin Assignments for the DCE Mode.

Function	Abbrev.	Direction	DB-25*	V.35	V.36	X.21
Frame Ground	FG	N/A	1	A	20	1
Transmit Data	TD	Input	2	P	4	2
Receive Data	RD	Output	3	R	6	4
Request to Send	RTS	Input	4	C	7	3
Clear to Send	CTS	Output	5	D	9	
Data Set Ready	DSR	Output	6	E	11	
Signal Ground	SG	N/A	7	B	19	8
Data Carrier Detect	DCD	Output	8	F	13	5
Secondary Receiver Clock	(S)RC	Output	9	X	26	13
Secondary Data Carrier Detect	(S)DCD	Output	10		31	12
Secondary External Transmitter Clock	(S)ETC	Input	11	W	35	7
Secondary Transmitter Clock	(S)TC	Output	12	AA	23	
Secondary Clear to Send	(S)CTS	Output	13		27	
Secondary Transmit Data	(S)TD	Input	14	S	22	9
Transmitter Clock	TC	Output	15	Y	5	
Secondary Receive Data	(S)RD	Output	16	T	24	11
Receiver Clock	RC	Output	17	V	8	6
Local Loopback			18			
Secondary Request to Send	(S)RTS	Input	19		25	10
Data Terminal Ready	DTR	Input	20	H	12	
Remote Loopback			21			
Secondary Data Set Ready	(S)DSR	Output	22		29	
Secondary Data Terminal Ready	(S)DTR	Input	23		30	
External Transmitter Clock	ETC	Input	24	U	17	14
Test Indicator			25			

5.4 DB25(M) vs. M.34(M) Cable

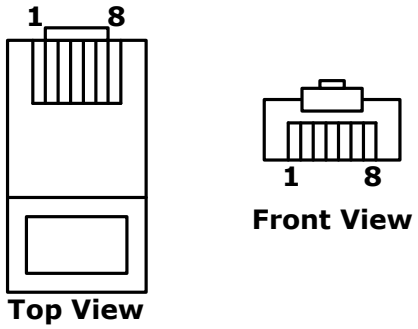
DB25 (M) vs. M.34 (M) Cable (V.35)



5.5 E1 Cable

G.703 120Ω Connector (RJ-45)

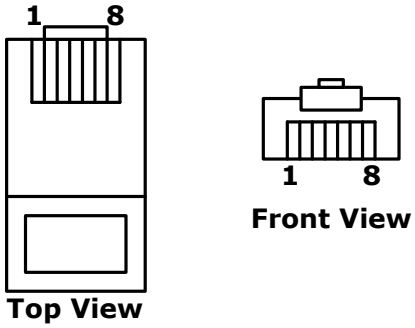
The 120Ω E1 Port interface is a 8 position modular jack, the following table displays the pin our assignments.

Pin Number	Description	Figure
1	E1 interface receive pair-ring	
2	E1 interface receive pair-tip	
3	No connection	
4	E1 interface transmit pair-ring	
5	E1 interface transmit pair-tip	
6	No connection	
7	No connection	
8	No connection	

5.6 DSL Cable

DSL Interface Pin Assignments (RJ-45)

The DSL interface is standard eight-pin modular jack. The table below displays the pin out assignments.

Pin Number	Description	Figure
1	No connection	
2	No connection	
3	No connection	
4	ANALOG Input/Output	
5	ANALOG Input/Output	
6	No connection	
7	No connection	
8	No connection	